

Click the cursor in the **Make** cell for the new car and add 'Ford'. The new ID number will automatically appear in the **ID** field, as you set this field as an AutoNumber type. Move the cursor and enter the **Model**, **Colour**, **Year** and **Extras** in the same way. You can always use copy and paste for some data. For example, if you need to make sure the spelling of Escort is correct, copy and paste it from record 67 above. For the **PPrice** and **SPrice** fields, enter only the numbers (and decimal point if this is required). Do not attempt to enter any other characters like the currency symbol. As you press the <Enter> key after adding the prices **Access** will set the data into currency format. The **Valet** field will automatically default to No. Move into this field and enter Yes in this cell. As you enter each item of data **Access** will automatically save it.

Check your data entry carefully using **visual verification**. This is when you compare the original data on paper (in this case, in Task 11b) with the data that you have entered into the computer. Any data entry error in a database may cause you errors when you try to use the database to search or sort. Save the database.

### Task 11c

Open the file that you saved at the end of Task 11b.

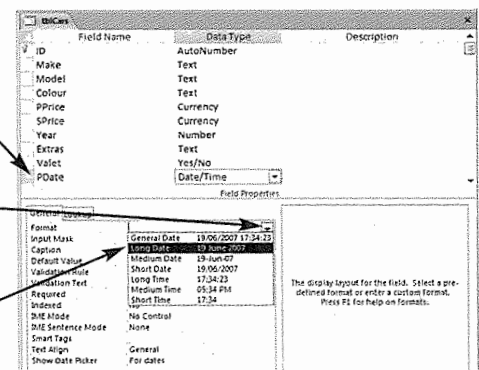
Add a new field to the database called PDate. Add the purchase date of 30 September 2009 for the next record.

Open the database and open the table **tblCars** in **Design View**. Move to the empty row below the **Valet** field and enter the **Fieldname PDate**.

In the **Data Type** box use the drop-down list to select the **Date/Time** type.

Choose the most appropriate **Format** for the question. In this case, the task asks for a **Long Date** format.

Save the database and select the **Datasheet View**. Move the cursor into the **PDate** field for the new record (the Silver Ford Escort) and use the **Calendar** icon to select the correct date.



67 Ford	Escort	Silver	£3,450.00	£4,295.00	2004 Air Conditioning	Central Locking
69 Ford	Escort	Silver	£4,350.00	£5,285.00	2002 Alarm	Central Locking Alloy Wheels
(New)						



**Activity 11b**

Open the file saved in Activity 11a. Add these three items of stationery to the database.

Code	Type	Description	Quantity	Colour	SPrice	PPrice	Discount
44282	Lever Arch File	Laminated Lever Arch Files	1	Red	57.22	28.96	N
44283	Lever Arch File	Laminated Lever Arch Files	1	Yellow	57.22	28.96	N
47478	Spine Label	Eastlight Spine Lables	100		30	13.86	Y

**11.4 Performing searches**

In Access you can search for data using a Query. This will allow you to select a subset of the data stored in your table. Each query is created and saved and can be used again later. Even if new data is added to the table, when you open a query again it will select the subset from all the data, including the new data.

**Task 11d**

Open the file that you saved at the end of Task 11c.

A customer would like a car made by Ford. Find the customer a list of all the cars in the garage made by Ford.

Open the database that you saved at the end of Task 11c. You do not need to open the table that you created earlier. Select the **Create** tab and find the **Other** section on the right. Click on the **Query Wizard** icon.

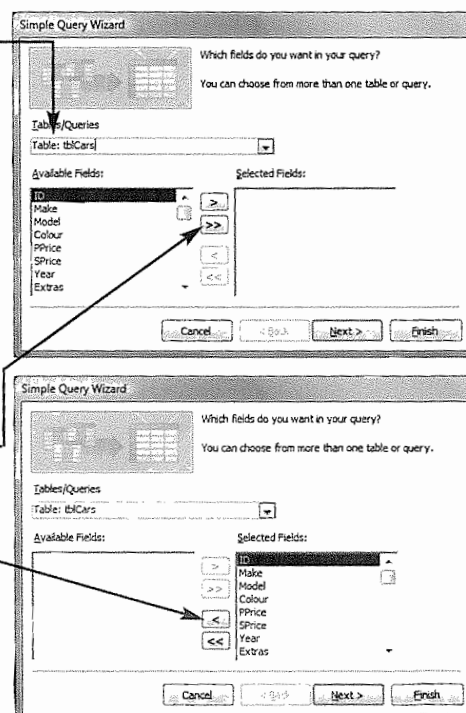


This is the easiest way of performing a search and opens the **New Query** window. Select the **Simple Query Wizard** and click on **OK**.

In the **Simple Query Wizard** window, make sure that the table name has been selected in the **Tables/Queries** box. As this is your first query this is the only option in this box, but each time you create a new query it will be shown here. If you select a previous query rather than the table, you are likely to get incorrect results.

For Task 11d, it would be appropriate to show the customer all the fields except the **ID** field, the price that the garage bought the car for (the **PPrice** field) and the date the garage purchased the car (the **PDate** field). Move all of the fields into the query using the double arrow key.

Select the **ID** field, the **PPrice** field and the **PDate** field in turn and click on the single arrow to remove them from the selection. When you have got only the required fields, click **Next >**. Select **Next >** again.



Enter a name for the query. This query may be turned into a report at some point and the name you give the query may become the title for the report. You may therefore wish to add your name to the query name.

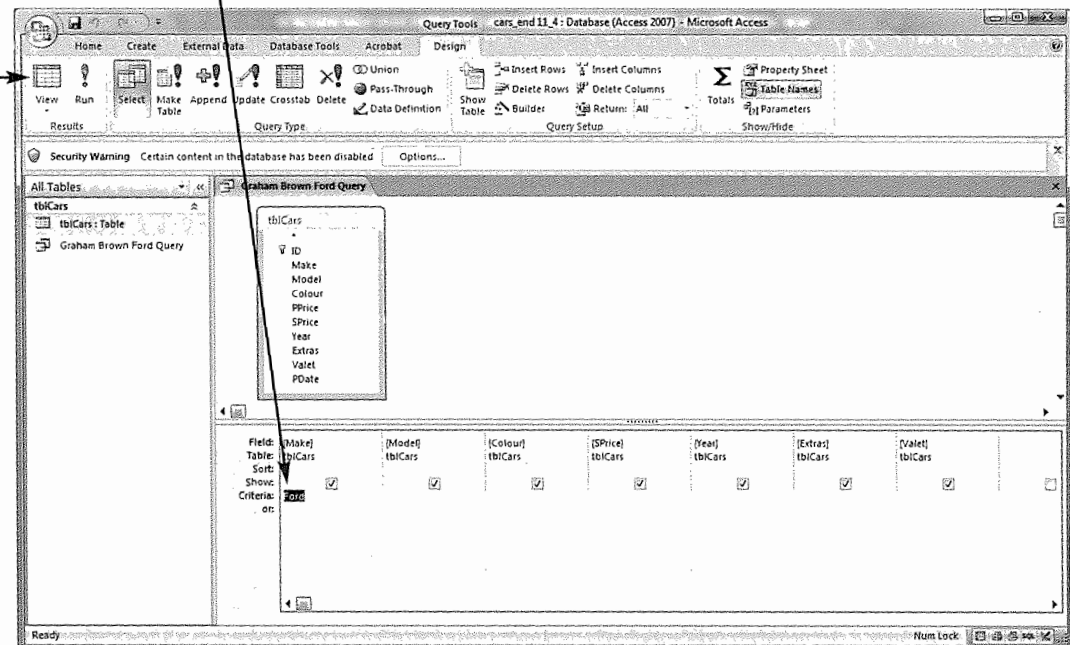
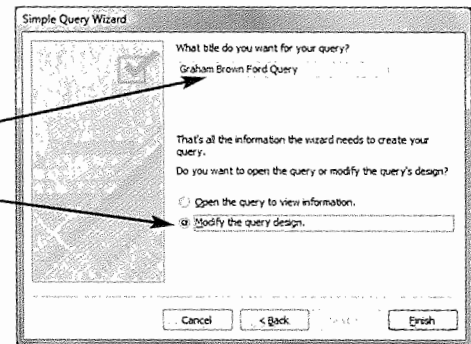
Select the radio button for **Modify the query design** before clicking on **Finish**.

This opens the query in **Design View**.

**Datasheet View** can be seen by selecting the drop-down list under the **View** icon.

However, at the moment the query will still contain all of the records as we have not yet performed the search.

To perform the query, move the cursor into the **Criteria:** row of the **Make** field and type **Ford**. You do not need to use speech marks, as *Access* will put these in for you. This will extract only the cars made by Ford.



Now select the **Datasheet View** to see the results of the query. The number of records can be seen at the bottom of the window in this view. There should be 25 Ford cars in the query. Save the query.

## Task 11e

Open the file that you saved at the end of Task 11d.

The manager would like to see all the details of all the Fords that need valeting.

### Hint

This is called an AND Query, because the **Make** has to be Ford AND the **Valet** field has to be Yes.

Create the query in a similar way to the one for Task 11d. Select all the fields and when you **Modify the query design**, enter **Ford** in the **Criteria:** row of the **Make** column and **Yes** in the same **Criteria:** row for the **Valet** column. The selection will look like this and only two cars will be found using this search.

Field:	[Make]	[Model]	[Colour]	[PPrice]	[SPPrice]	[Year]	[Extras]	[Valet]	[PDate]
Table:	tblCars	tblCars	tblCars	tblCars	tblCars	tblCars	tblCars	tblCars	tblCars
Sort:									
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:	"Ford"							Yes	
or:									

### Task 11f

Open the file that you saved at the end of Task 11e.

The manager would like to see all the details of all the cars made by Ford or Vauxhall.

Create the query in a similar way to the one for Task 11e. In the **Simple Query Wizard** window, make sure that the table name has been selected in the **Tables/Queries** box. If you select one of the previous queries rather than the table, you are likely to get incorrect results.

Select all the fields and when you **Modify the query design**, enter **Ford or Vauxhall** in the **Criteria:** row of the **Make** column. The selection will look like this and 37 cars will be found using this search.

Field:	[ID]	[Make]	[Model]
Table:	tblCars	tblCars	tblCars
Sort:			
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:		"Ford" Or "Vauxhall"	
or:			

### Task 11g

Open the file that you saved at the end of Task 11f.

The Sales Manager would like to see all the details of all the cars in stock not made by Ford.

Create the query in a similar way to the one for Task 11f. Select all the fields and when you **Modify the query design**, enter **Not Ford** in the **Criteria:** row of the **Make** column. The selection will look like this and 43 cars will be found using this search.

Field:	[ID]	[Make]	[Model]
Table:	tblCars	tblCars	tblCars
Sort:			
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:		Not "Ford"	
or:			

### Task 11h

Open the file that you saved at the end of Task 11g.

The manager would like to see all the details of all the cars that have alloy wheels.

By examining the data in the database you can see that the text 'Alloy Wheels' could appear in the Extras field. It may not be the only extra that a car has, there could be other extras listed before it or after it within the field.

To find all the cars with this extra you must create the query in a similar way as for Task 11g. Select all the fields and when you **Modify the query design**, enter **\*Alloy Wheels\*** in the **Criteria:** row of the **Extras** column. The stars tell Access that

Click the cursor in the **Make** cell for the new car and add 'Ford'. The new ID number will automatically appear in the **ID** field, as you set this field as an AutoNumber type. Move the cursor and enter the **Model**, **Colour**, **Year** and **Extras** in the same way. You can always use copy and paste for some data. For example, if you need to make sure the spelling of Escort is correct, copy and paste it from record 67 above. For the **PPrice** and **SPrice** fields, enter only the numbers (and decimal point if this is required). Do not attempt to enter any other characters like the currency symbol. As you press the <Enter> key after adding the prices *Access* will set the data into currency format. The **Valet** field will automatically default to No. Move into this field and enter Yes in this cell. As you enter each item of data *Access* will automatically save it.

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Open the file that you saved at the end of Task 11b.

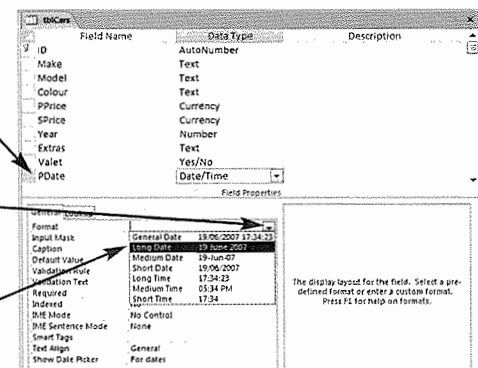
Add a new field to the database called PDate. Add the purchase date of 30 September 2009 for the next record.

Open the database and open the table **tblCars** in **Design View**. Move to the empty row below the **Valet** field and enter the **Fieldname** **PDate**.

In the **Data Type** box use the drop-down list to select the **Date/Time** type.

Choose the most appropriate **Format** for the question. In this case, the task asks for a **Long Date** format.

Save the database and select the **Datasheet View**. Move the cursor into the **PDate** field for the new record (the Silver Ford Escort) and use the **Calendar** icon to select the correct date.



67 Ford	Escort	Silver	£3,450.00	£4,295.00	2004 Air Conditioning	Central Locking
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(New)						



**Activity 11b**

Open the file saved in Activity 11a. Add these three items of stationery to the database.

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47478	Spine Label	Eastlight Spine Lables	100		30	13.86	Y

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In Access you can search for data using a Query. This will allow you to select a subset of the data stored in your table. Each query is created and saved and can be used again later. Even if new data is added to the table, when you open a query again it will select the subset from all the data, including the new data.

**Task 11d**

Open the file that you saved at the end of Task 11c.

A customer would like a car made by Ford. Find the customer a list of all the cars in the garage made by Ford.

Open the database that you saved at the end of Task 11c. You do not need to open the table that you created earlier. Select the **Create** tab and find the **Other** section on the right. Click on the **Query Wizard** icon.

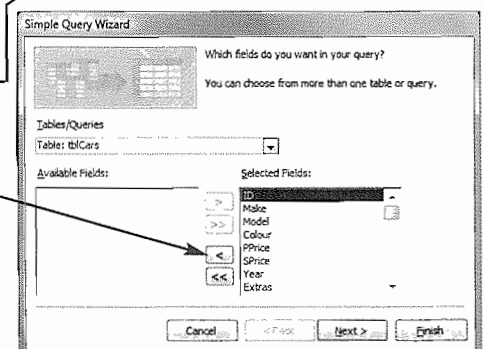
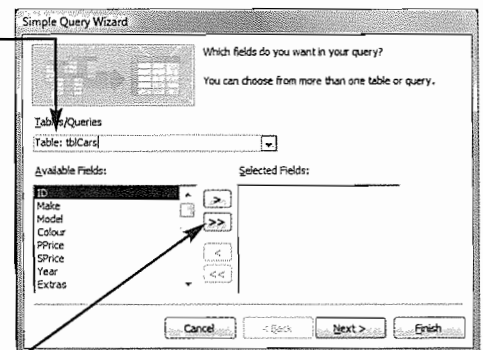


This is the easiest way of performing a search and opens the **New Query** window. Select the **Simple Query Wizard** and click on **OK**.

In the **Simple Query Wizard** window, make sure that the table name has been selected in the **Tables/Queries** box. As this is your first query this is the only option in this box, but each time you create a new query it will be shown here. If you select a previous query rather than the table, you are likely to get incorrect results.

For Task 11d, it would be appropriate to show the customer all the fields except the **ID** field, the price that the garage bought the car for (the **PPrice** field) and the date the garage purchased the car (the **PDate** field). Move all of the fields into the query using the double arrow key.

Select the **ID** field, the **PPrice** field and the **PDate** field in turn and click on the single arrow to remove them from the selection. When you have got only the required fields, click **Next >**. Select **Next >** again.



Enter a name for the query. This query may be turned into a report at some point and the name you give the query may become the title for the report. You may therefore wish to add your name to the query name.

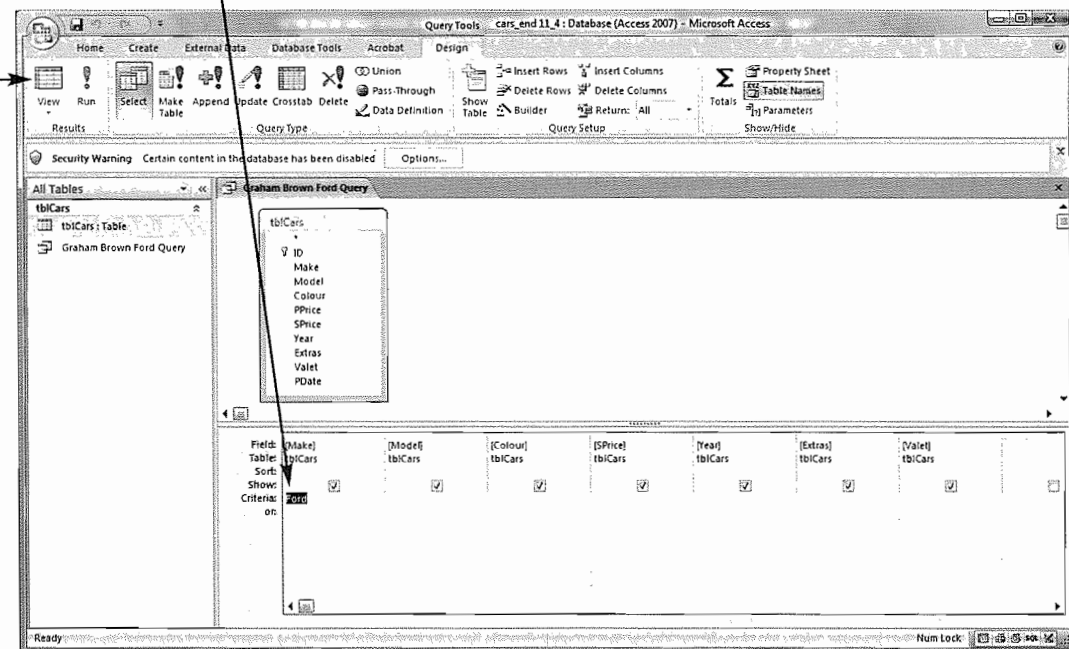
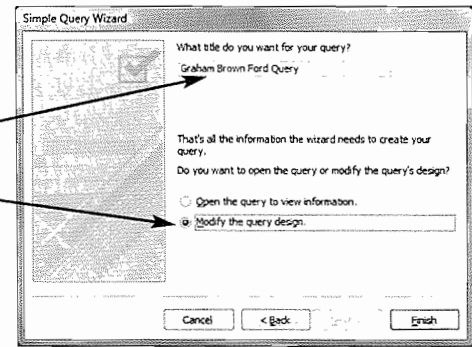
Select the radio button for **Modify the query design** before clicking on **Finish**.

This opens the query in **Design View**.

**Datasheet View** can be seen by selecting the drop-down list under the **View** icon.

However, at the moment the query will still contain all of the records as we have not yet performed the search.

To perform the query, move the cursor into the **Criteria:** row of the **Make** field and type **Ford**. You do not need to use speech marks, as **Access** will put these in for you. This will extract only the cars made by Ford.



Now select the **Datasheet View** to see the results of the query. The number of records can be seen at the bottom of the window in this view. There should be 25 Ford cars in the query. Save the query.

### Task 11e

Open the file that you saved at the end of Task 11d.

The manager would like to see all the details of all the Fords that need valeting.

### Hint

This is called an AND Query, because the **Make** has to be Ford AND the **Valet** field has to be Yes.

Create the query in a similar way to the one for Task 11d. Select all the fields and when you **Modify the query design**, enter **Ford** in the **Criteria:** row of the **Make** column and **Yes** in the same **Criteria:** row for the **Valet** column. The selection will look like this and only two cars will be found using this search.

Field:	[ID]	[Make]	[Model]	[Colour]	[PPrice]	[SPrice]	[Year]	[Extras]	[Valet]	[POdate]
Table:	tblCars	tblCars	tblCars	tblCars	tblCars	tblCars	tblCars	tblCars	tblCars	tblCars
Sort:										
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:		Ford							Yes	
or:										

### Task 11f

Open the file that you saved at the end of Task 11e.

The manager would like to see all the details of all the cars made by Ford or Vauxhall.

Create the query in a similar way to the one for Task 11e. In the **Simple Query Wizard** window, make sure that the table name has been selected in the **Tables/Queries** box. If you select one of the previous queries rather than the table, you are likely to get incorrect results.

Select all the fields and when you **Modify the query design**, enter **Ford or Vauxhall** in the **Criteria:** row of the **Make** column. The selection will look like this and 37 cars will be found using this search.

Field:	[ID]	[Make]	[Model]
Table:	tblCars	tblCars	tblCars
Sort:			
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:		Ford Or Vauxhall	
or:			

### Task 11g

Open the file that you saved at the end of Task 11f.

The Sales Manager would like to see all the details of all the cars in stock not made by Ford.

Create the query in a similar way to the one for Task 11f. Select all the fields and when you **Modify the query design**, enter **Not Ford** in the **Criteria:** row of the **Make** column. The selection will look like this and 43 cars will be found using this search.

Field:	[ID]	[Make]	[Model]
Table:	tblCars	tblCars	tblCars
Sort:			
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:		Not Ford	
or:			

### Task 11h

Open the file that you saved at the end of Task 11g.

The manager would like to see all the details of all the cars that have alloy wheels.

By examining the data in the database you can see that the text 'Alloy Wheels' could appear in the Extras field. It may not be the only extra that a car has, there could be other extras listed before it or after it within the field.

To find all the cars with this extra you must create the query in a similar way as for Task 11g. Select all the fields and when you **Modify the query design**, enter **\*Alloy Wheels\*** in the **Criteria:** row of the **Extras** column. The stars tell Access that



**Hint**

To search for something that is at the start of the data, use Text\*, for example Bl\* in the Colour field will find all the cars with the first Colour Blue or Black, but would not find colours like Light Blue. Placing the star at the start of a search string will only find those things ending with the search string.

you are performing a **wildcard search**. The selection will look like this and 35 cars will be found using this search.

Field:	[Year]	[Extras]	[Valeit]
Table:	tblCars	tblCars	tblCars
Sort:			
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Criteria:		Like "*Alloy Wheels"	

**Task 11i**

Open the file that you saved at the end of Task 11h.

The Sales Manager would like to see details of all the cars in stock for sale for less than or equal to £4125.

Create the query in a similar way as for Task 11g. Be careful not to use any symbols like < or £ in the query name. Select all the fields and when you **Modify the query design**, enter **<=4125** in the **Criteria:** row of the **SPrice** column. The selection will look like this and 18 cars will be found using this search.

Field:	Colour	SPrice	Year
Table:	tblCars	tblCars	tblCars
Sort:			
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Criteria:		<=4125	

Similar mathematical formulae can be used, with < for less than, > for greater than, >= for greater than or equal to and = for equals. These mathematical formulae cannot be used for queries involving text fields, but can be used for any numeric, date or time fields.

**Activity 11c**

Open the file saved in Activity 11c.

Search the database to find the following information for your manager. For each search show all the fields in the table.

- 1 Find all the blue stationery items.
- 2 Find all the blue or black stationery items.
- 3 Find all the items where the colour is not blue.
- 4 Find all the red items where the discount is yes.
- 5 Find all the items where the type contains the word 'file'.
- 6 Find all the items where the description contains the word 'file'.
- 7 Find all items with a quantity of less than or equal to 10.
- 8 Find all items where the quantity is 10.
- 9 Find all items with a quantity of greater than 1.
- 10 Find all items with a quantity of greater than or equal to 10.
- 11 Find all items where the sales price is less than £10.

## 11.5 Producing reports

The word 'report' can be quite confusing. A dictionary definition is 'a document that gives information about an investigation or a piece of research'. For the practical examinations a report has this generic meaning: 'a document that gives information'. This is often confused with a report created in *Access*. The report created in *Access* will often be the most suitable report for a task, but sometimes it may be better to produce a report in a word processor, copying and pasting information into a document. For each task, you will need to decide which method is the most suitable.

### Task 11j

Open the database that you saved at the end of Task 11i.  
Produce a report which:

- shows all the cars made by Ford
- displays only the Make, Model, Colour, SPrice, Extras and Valet fields within the width of a landscape page
- has your name on the left in the header of each page
- has a title 'All Ford cars in stock' centre aligned at the top of the first page
- has a subtitle 'request for Mr David Watson' right aligned at the top of the first page.

#### Hint

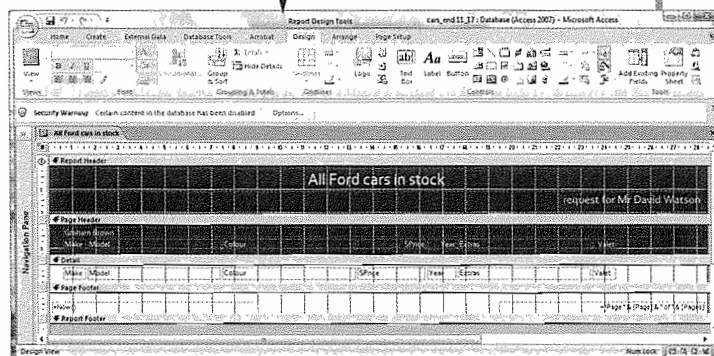
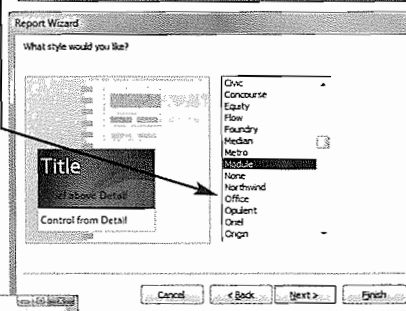
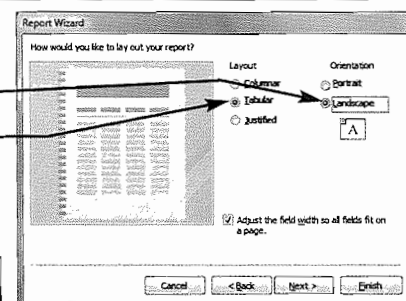
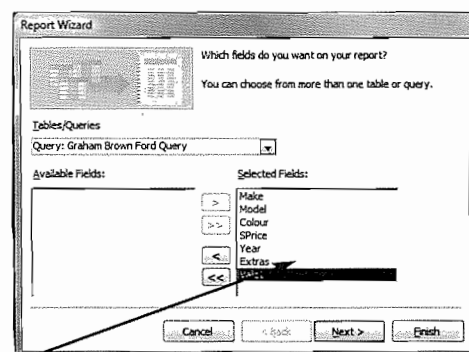
You *must* create the query first and then base the report upon the query.

Open the database saved in Task 11i. Select the **Create** tab and find the **Reports** section. Click on the **Report Wizard** icon to open the **Report Wizard** window.

In the **Tables/Queries** box you need to select the correct query. For this task, the report will be based upon the query to select only the Fords (you created this query in Task 11d). Use the arrow buttons to move the correct fields from the **Available Fields:** into the **Selected Fields:** box like this, then click on **Next >**. Grouping is not needed at IGCSE level, so click on **Next >** again. For this task, you are not asked to sort the report (which will be covered later in the chapter), so click on **Next >** again to get this.

The task told you to select a single landscape page. The page orientation is chosen using the **Orientation** radio buttons. Select **Landscape**. Use the **Layout** section to choose how the page will be laid out; in this case a tabular format has been selected. Click on **Next >**.

Choose the style for your report and click on **Next >**. Change the report name, so that it is 'All Ford cars in stock' (which is the title from the task). As you still need to add the subtitle and ensure that the layout is correct, select the **Modify the report's design** radio button and click on **Finish**. The design view of the report will look similar to this.



Each section of the report is shown with a light blue bar. The top section is the **Report Header**. Anything that you place in this section appears only once at the start of the document. Anything that you place in the **Page Header** is shown at the top of each page, in this case the fieldnames. Similarly, information in the **Page Footer** is shown at the bottom of each page. The **Report Footer** appears at the very end of a report, although in this example the Report Footer is empty (it is not shown in white) and therefore will not be shown in this document. The **Detail** section is the most important, as this single row is where the data is shown for each car. This single row will appear as many rows (as many as there are Ford cars in the database) and display the details of each record.

The task tells you to place your name on the left in the header of each page. Move the cursor to the top of the light blue bar showing the **Detail** row; click on this so that the cursor changes into an arrow. Hold the left mouse button down and drag the top of the detail row down about 5 millimetres. Select all of the controls (objects) in the **Page Header** by dragging (and holding) the left mouse button.

Move all of these controls down the page about 5 millimetres, so that they look like this.

The **Design** tab should already be selected. Find the **Controls** section and click on the **Label** icon.

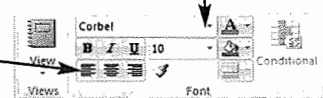
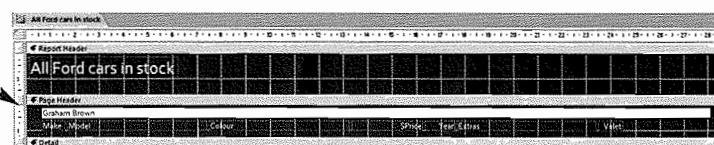
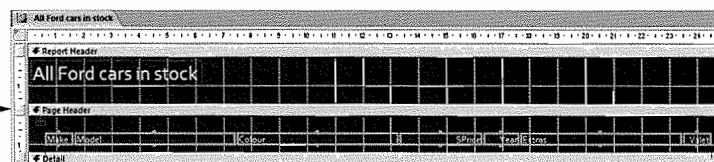
Drag a new control into the **Page Header** and type your name into this control. In this example,

when you move the cursor out of the control and click anywhere else on the report it does not show the text clearly. This label needs editing so that the text is visible and it is left aligned. Select the control and use the tools in the **Font** section of the **Design** tab to set the font colour to white and the alignment to left.

To see what the report will look like at any time, find the **Views** section of the **Design** tab and select the **Report View**. Use this section to change back to the **Design View** at any time.

The title 'All Ford cars in stock' needs to be centre aligned. Click on the control containing this label, and use the drag handle to stretch the control to 28.2 centimetres (almost the edge of the page). If you stretch the control further to the right it will add another page width to the final printout, wasting paper when it is printed and no longer fitting to a single page wide. Once the control fits the page width, then centre align the label using the **Center** icon.

To add the subtitle, drag the light blue bar for the **Page Header** down about 5 millimetres. Add a new label, the full width of the page, in the **Report Header**, just below the title. Type the text 'request for Mr David Watson' into this control. Set the font colour to white as before and right align this subtitle using the **Align Text Right** icon. The design view of the report looks like this.



All Ford cars in stock																											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Report Header																											
All Ford cars in stock																								request for Mr David Watson			
Page Header																											
Graham Brown				Colour										SPrice				Year Extras				Vale					
Make Model																											
Detail																											
Make		Model		Colour		SPrice		Year		Extras		Vale															
Page Footer																											
=Now()																								=Page & (Page) & of & (Pages)			

### Activity 11d

Open the database that you saved at the end of Activity 11c. Produce a report which:

- displays all the data in the table within the width of a landscape page
- has your name on the right in the header of each page
- has a title 'All stationery in stock' centre aligned at the top of the first page
- has a subtitle 'request for the manager' right aligned at the top of the first page.

### Task 11k

Open the database that you saved at the end of Task 11j. Produce a report which:

- displays all the data for all the cars with alloy wheels within the width of a portrait page
- has your name in the report header followed by 'Cars with alloy wheels'.

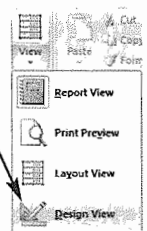
Open the database saved in Task 11j. Select the **Create** tab and in the **Reports** section click on the **Report Wizard** icon. In the **Report Wizard** window, select the query for alloy wheels (that you created in Task 11h) in the **Tables/Queries** box. As the task says 'display all the data', use the arrow buttons to move all the fields from **Available Fields:** to the **Selected Fields:** box. Go through the wizard as you did for the previous task, making sure that you set the page **Orientation** to **Portrait**. When the wizard has finished, the report is created and looks similar to this.

Graham Brown Alloy Wheels									
ID	Make	Model	Colour	PPrice	SPrice	Year	Extras	let	PDate
11	Ford	Escort	Green	*****	*****	1111	Air Conditioning	All	11
10	Ford	Escort	Dark blue	*****	£3,135.00	1111	Alloy Wheels		11
54	Ford	Escort RS turbo	Silver	*****	*****	1111	Alarm Central Locks		11
59	Ford	Mondeo	Blue	*****	*****	1111	Alloy Wheels Alarm		11

You can see that *Access* has attempted to make all the fields fit across the page, but this has not been successful as not all of the data is fully visible.

In the practical examinations you must show all of the required data in full. Select the **Create** tab, and in the **Views** section click on the **View** icon. Use the drop-down menu to select **Design View**.

Find the control for the **ID** field in the **Detail** section of the report. Use the left drag handle to make this control a little larger. It should change from this to this.



You can see that the control for the label in the **Page Header** has also been stretched. Use the **View** icon to change back to **Report View** to see the effect that this has made to the report. The left column now displays all of the figures (including the top row).

**Graham Brown Alloy Wheels**

ID	Make	Model	Colour	PPrice	SPrice	Year	Extras	Valet	PDate
62	Ford	Escort	Green	*****	*****	###	Air Conditioning	All	##
10	Ford	Escort	Dark blue	*****	£3,135.00	###	Alloy Wheels		##
54	Ford	Escort RS turbo	Silver	*****	*****	###	Alarm Central Lock		##
59	Ford	Mondeo	Blue	*****	*****	###	Alloy Wheels Alarm		##

To make more space available for widening some fields, you will need to reduce the width of other fields. The **Make** field has taken more of the page width than it needs. Use the drag handle on the right of this field to shrink the field. Use the **Report View** to make sure that all of data is visible (you will need to scroll down through all the data), but space is not wasted. Repeat this for the **Model** and **Colour** fields. Stretch the **PPrice**, **SPrice** and **Year** fields so that all the data is visible. The **Design View** of the report should look like this.

**Graham Brown Alloy Wheels**

ID	Make	Model	Colour	PPrice	SPrice	Year	Extras	Valet	PDate
62	Ford	Escort	Green	*****	*****	###	Air Conditioning	All	##
10	Ford	Escort	Dark blue	*****	£3,135.00	###	Alloy Wheels		##
54	Ford	Escort RS turbo	Silver	*****	*****	###	Alarm Central Lock		##
59	Ford	Mondeo	Blue	*****	*****	###	Alloy Wheels Alarm		##

At the moment, ignore the **Extras** field, as this is the longest field. Stretch the **Valet** and **PDate** fields so that all the data and labels fit within the width of the page. Make sure all the data and labels are fully visible. The data and labels may be different widths to those shown here, depending on the formats chosen for each field. Now stretch the **Extras** field until the **PDate** control just reaches the edge of the page but no further.

**Graham Brown Alloy Wheels**

ID	Make	Model	Colour	PPrice	SPrice	Year	Extras	Valet	PDate
62	Ford	Escort	Green	*****	*****	###	Air Conditioning	All	##
10	Ford	Escort	Dark blue	*****	£3,135.00	###	Alloy Wheels		##
54	Ford	Escort RS turbo	Silver	*****	*****	###	Alarm Central Lock		##
59	Ford	Mondeo	Blue	*****	*****	###	Alloy Wheels Alarm		##

Change to **Report View** and the report appears like this. You can see that all of the **Extras** still do not fit within the space.

**Graham Brown Alloy Wheels**

ID	Make	Model	Colour	PPrice	SPrice	Year	Extras	Valet	PDate
62	Ford	Escort	Green	£1,200.00	£2,925.00	2004	Air Conditioning	Alloy Wheels	No
10	Ford	Escort	Dark blue	£2,395.00	£3,135.00	2003	Alloy Wheels		No
54	Ford	Escort RS turbo	Silver	£2,495.00	£3,245.00	1999	Alarm Central Locking	Alloy W	No
59	Ford	Mondeo	Blue	£2,495.00	£3,245.00	2002	Alloy Wheels Alarm		No

In **Design View**, move into the **Detail Row** and drag the bottom handle of the control for the **Extras** field down so that the control becomes exactly twice as high.

**Graham Brown Alloy Wheels**

ID	Make	Model	Colour	PPrice	SPrice	Year	Extras	Valet	PDate
62	Ford	Escort	Green	*****	*****	###	Air Conditioning	All	##
10	Ford	Escort	Dark blue	*****	£3,135.00	###	Alloy Wheels		##
54	Ford	Escort RS turbo	Silver	*****	*****	###	Alarm Central Lock		##
59	Ford	Mondeo	Blue	*****	*****	###	Alloy Wheels Alarm		##

Change to **Report View** and check that all the data and labels fit within the width of a single page, like this.

Save this report.

**Graham Brown Alloy Wheels**

ID	Make	Model	Colour	PPrice	SPrice	Year	Extras	Valet	PDate
62	Ford	Escort	Green	£1,200.00	£2,925.00	2004	Air Conditioning	Alloy Wheels	No
10	Ford	Escort	Dark blue	£2,395.00	£3,135.00	2003	Alloy Wheels		No
54	Ford	Escort RS turbo	Silver	£2,495.00	£3,245.00	1999	Alarm Central Locking	Alloy Wheels	No
59	Ford	Mondeo	Blue	£2,495.00	£3,245.00	2002	Alloy Wheels Alarm		No

### Hint

The Discount field can appear as Yes/No, True/False or as a tick box. All of these would be correct for this question.

### Activity 11e

Open the database that you saved at the end of Activity 11d.

Produce a report which:

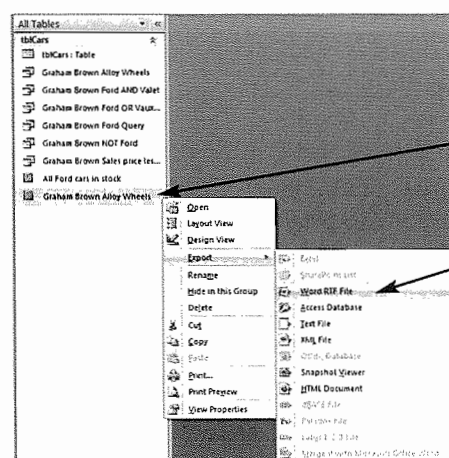
- displays all the data for all the items where the quantity is greater than or equal to 10 within the width of a portrait page
- has your name in the header of each page
- has a title 'Quantity >=10' centre aligned at the top of the first page.

## Exporting data

Sometimes whole reports, queries or the data within them need exporting into other packages to be manipulated as part of a report for someone, or to create a graph or chart.

### Task 11i

Export the report saved in Task 11k into rich text format so it can be included in a word-processed document.



In the **Navigation** pane, find the report that you saved in Task 11k and right click the mouse button on the report name to get the drop-down menu.

Select the option to **Export**. This will open another drop-down menu. You need to export into .rtf format, so select **Word RTF File**.

This opens the **Export - RTF File** window.

Click on the **Browse...** button to select a folder to save the document into. In the practical examinations you will need to use this file for another task, so select the tick box for **Open the destination file after the export operation is complete**, then click on

**OK**. The exported file will appear. Close the **Export - RTF File** window.

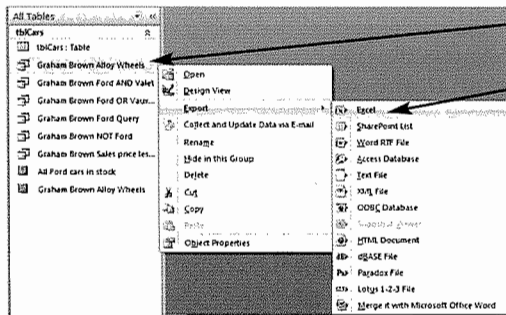
### Hint

If you need to export the report without any formatting, select the **Text File** option.

### Task 11m

Export all the details of all the cars with alloy wheels into a format that can be used to produce a graph.

The best package within the *Office* suite for creating graphs is *Excel*. You have just exported the report on all the details of the cars with alloy wheels into .rtf format. However, if you try to export the report into *Excel* you will not be able to do so, as the report holds its title and formatting as well as the data. Instead, you need to export the *query* for 'alloy wheels' rather than the *report*.



Right mouse click on the query name, then select **Export**, followed by **Excel** from the drop-down menus to open the **Export – Excel Spreadsheet** window. Rather than reformatting the data, select the tick box for **Export data with formatting and layout**, and the tick box for **Open the destination file after the export operation is complete**. Click on **OK**. Close the **Export – Excel Spreadsheet** window.

### Hint

If you need to export the data into.csv format (comma separated values), Export it first into *Excel*, then save it in.csv format from *Excel*.

### Activity 11f

Export the report saved in Activity 11g into:

- rich text format
- a format that can be used to produce a graph
- a comma separated value format.

### Hiding data in a report

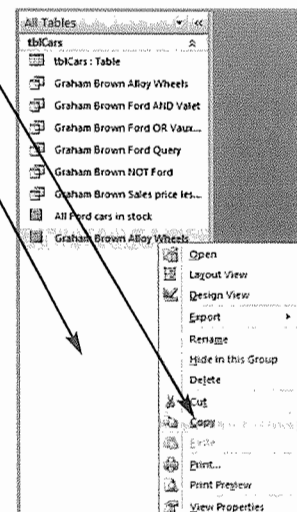
There are times when information in a report needs to be hidden in some way. In real applications a single report would be created for more than one task, and some data would be hidden. This process is often done automatically using a created report and a programming language. Although that is beyond the scope of this book, the ability to hide fields within a report is useful. An example of this is when an invoice would be produced for a customer, and the same document is used as a delivery note, so that it shows the details of the items ordered but the costs are hidden. In *Access* this can be done in one of two ways, the first is to make a control invisible; the second is to use a background colour that matches the text colour.

### Task 11n

Open the report created in Task 11k.

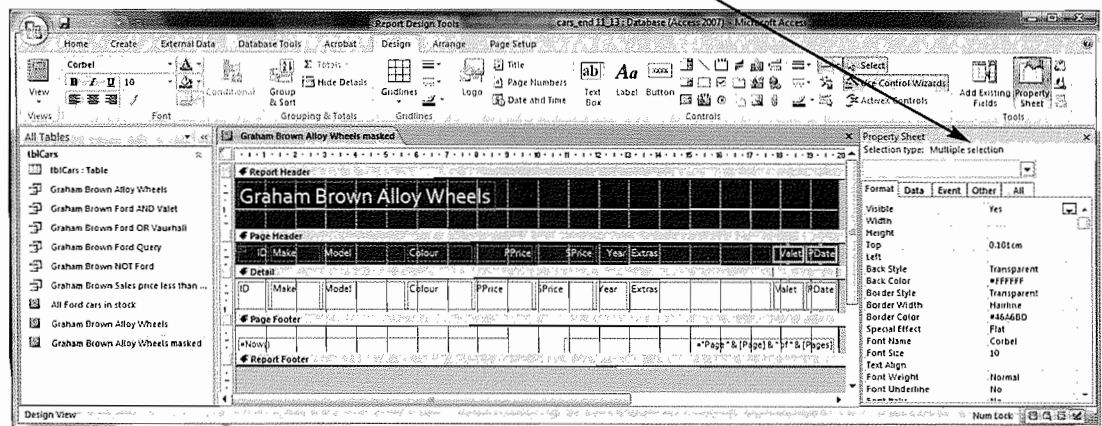
Hide all the labels and data for the Valet and PDate fields from the report. Hide the PPrice data (but not the title) by setting a black background.

Before starting this task it is wise to back up the report that you created in Task 11k. In the **Navigation** pane, right mouse click on the report name and select **Copy**. Move the cursor onto the whitespace in the **Navigation** pane and right mouse click again.

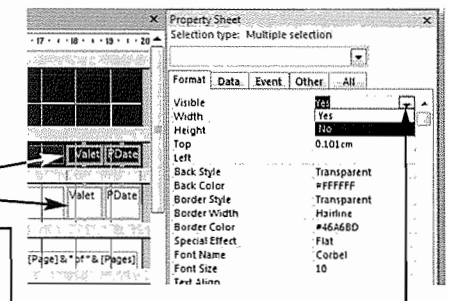





Select Paste from the drop-down menu, renaming the report if required. Open the report in **Design View**. Right mouse click on any of the field controls and select **Properties** from the bottom of the drop-down menu to open the **Property Sheet** pane.

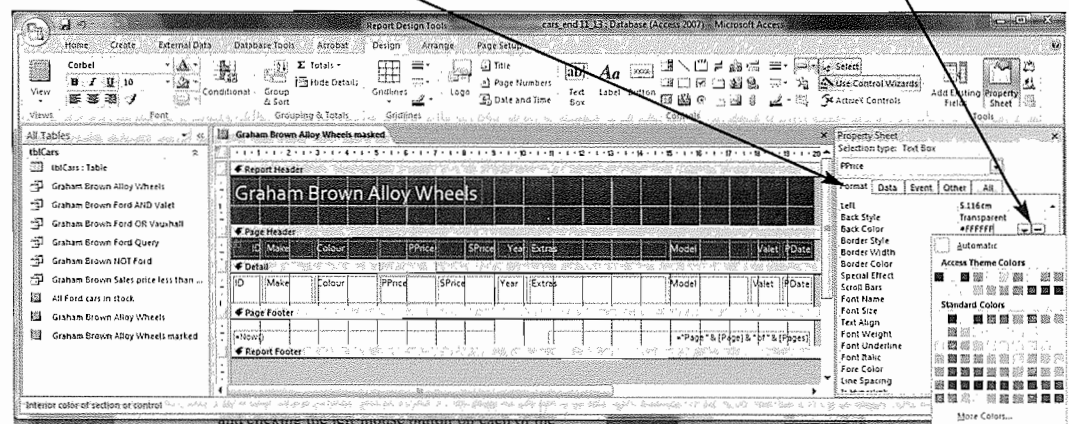


Select the four controls for the **Valet** and **PDate** fields (two for the labels and two for the data). These can be selected together by holding down the <Shift> key and clicking the left mouse button on each of the controls in turn. These should be highlighted like this.



In the **Property Sheet** pane, select the **Format** tab. Many of the options in the **Property Sheet** have small drop-down menus, which you can use to select pre-defined options; the arrow for the drop-down menu appears when you click in the cell. Use the drop-down list in the **Visible** section to select **No**, which will hide these controls.

To set a black background for the **PPrice** data, in the **Detail** row of the report select the control for **PPrice**. Move the cursor into the **Property Sheet** pane, selecting the **Format** tab. Find the **Back Color** section and use the  icon to select the colour palette.

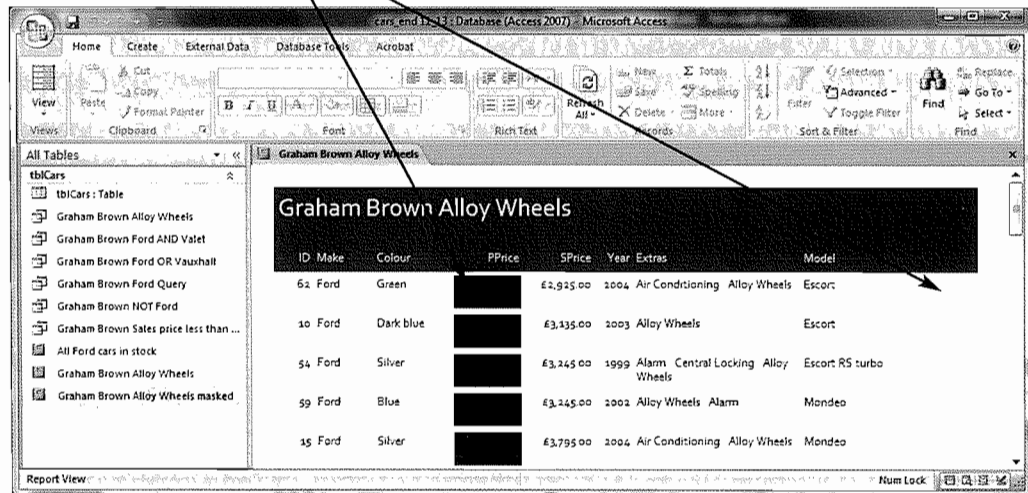




**Hint**

If you wish to change the display formats of any field, this can also be done in the **Property Sheet** pane using the **Format** tab. However it is better to set the formatting for the fields in the **Design View** of the table, as changing the display properties will not change the way that the data is stored and this could lead to errors if fields are used for calculations.

Select the black colour rather than the white background. You will notice that the colour code for this control has changed from #FFFFFF to #000000. You will learn more about this in Section 15.7. Change from **Design View** into **Report View** to see the changes. Save the changes to the report design. Close the report.

**Activity 11g**

Open the report created in Activity 11e.

Hide the label and data for the **Discount** field in the report and hide only the data in the **PPrice** field by setting a black background.

**Producing labels**

You may be required to produce other forms of output from your database, for example producing labels to advertise a product or address labels for mailing letters to customers.

**Task 11o**

Open the file that you saved at the end of Task 11n.

Find all the cars with a sale price of less than £4000 and for these cars produce labels which:

- have a page orientation of portrait
- fit two side by side on the page
- have a 16 point centre aligned heading 'Special Offer' at the top of each label
- show only the fields **Make**, **Model**, **Colour**, **SPrice**, **Year** and **Extras**, sorted into make and model order
- have your name at the bottom right of each label.

Design a new query to extract only the cars with a sale price of less than £4000, selecting only the **Make**, **Model**, **Colour**, **SPrice**, **Year** and **Extras** fields from the table as you step through the **Simple Query Wizard**. When you have selected these cars close the query and click the left mouse button on the query so that it is highlighted like this.

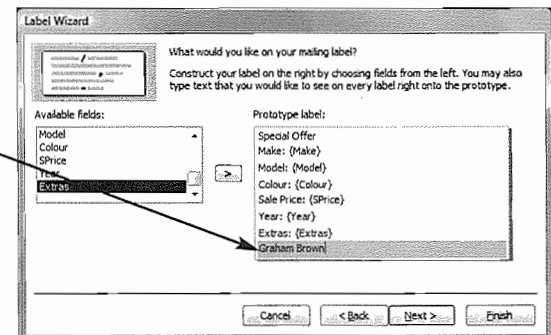
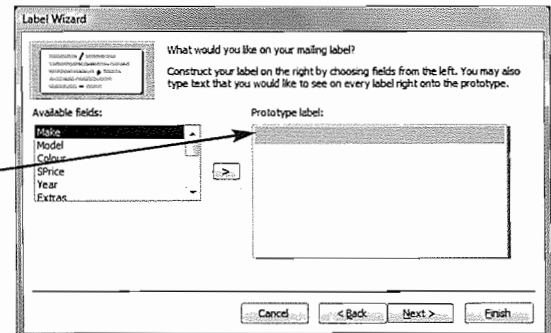
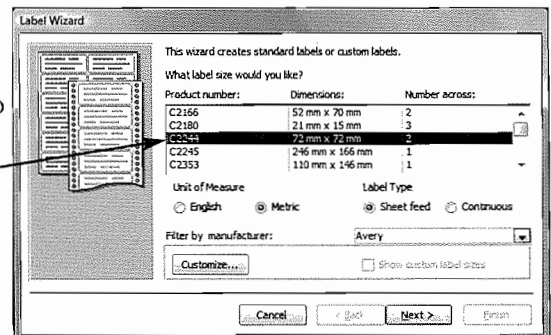
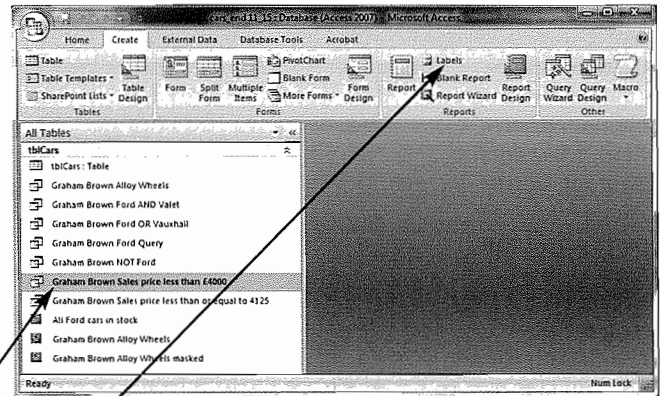
From the **Create** tab, find the **Reports** section and click on the **Labels** icon. This opens the **Label Wizard**. Select any label format that contains two labels across the page; in this case, use the C2244 labels as they are slightly deeper than the C2166 labels (and it is therefore easier to fit all the data and labels onto each label). Click on **Next >**.

The next screen asks for the font size and colour of the text on the label. Leave this set to a small size (it is easier to enlarge this later if needed, than to reduce it), like 8 points high. Click on **Next >**.

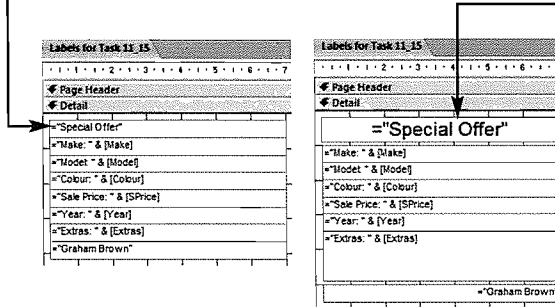
Type the text 'Special Offer' in the grey area as the top row of the label. Press <Enter> to move down to the second row. Each field needs moving onto the label – use the right arrow to move each field into the label, pressing <Enter> after each one to create a new row. You can type labels for each row if you wish to do so. When all of the fields have been moved across, add a final row with your name, then click on **Next >**.

Move the **Make**, then **Model** fields across into the right to sort the labels by make and model as specified in the task, then click on **Next >**.

Give the labels an appropriate name and select the radio button for **Modify the label design**. Click on **Finish**.



Select the **Home** tab and use the text formatting tools to change this into this.



Notice how the heading has been set to 16 point and centre aligned and the other fields moved down. The **Extras** field has been given more space, so that all the data should be visible. This will need checking when the labels are produced, and edited again if necessary. Your name at the bottom of the label should also be right aligned.

Check the labels' layout using the **Office** button followed by **Print** and **Print Preview**. Save the labels.



### Activity 11h

Open the database that you saved at the end of Activity 11g.

Find all the items where the discount is Yes and the sale price more than £30. For these cars produce labels which:

- have a page orientation of portrait and fit two side by side on the page
- have a 20 point right aligned heading 'Discount Offers' at the top of each label
- show only the fields **Type**, **Description**, **Colour** and **SPrice**, sorted into ascending order
- have your name centre aligned at the bottom of each label.

## 11.6 Using formulae in queries

You are sometimes asked to perform calculations at run time. This could be done in one of two ways. The first method is by creating a calculated field, so that each record has a calculation performed on it and the results are stored in a query. The other method is to calculate on all (or a selection of) the records, for example to add (sum) the data from a number of records.

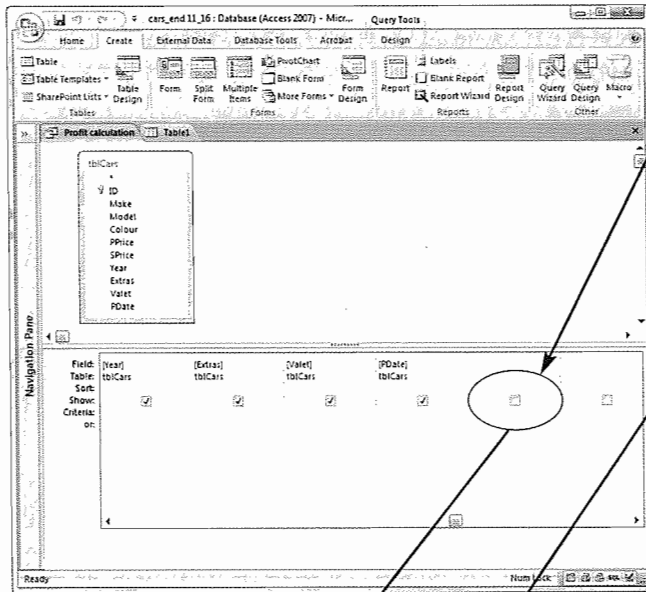
### Task 11p

Open the file saved in Task 11o.

Produce a new report from all the data which:

- contains a new field called **Profit** which is calculated at run time. This field will subtract the purchase price from the sale price
- has the **Profit** field formatted to currency with 2 decimal places
- contains a new field called **Percent** to calculate the percentage profit for each car at run time. This field will divide the profit by the sale price
- has the **Percent** field formatted as a percentage value with no decimal places.

To create a field that is calculated at run time, you must first open a query. For this task, the query will not be used to search for data, but be used to perform the calculation. Select the **Create** tab, then click on the **Query Wizard** icon and in the **New Query** window select the **Simple Query Wizard**. In the **Tables/Queries** box select the table **tblcars** as the source of the data. Select all fields using the double arrow key. Click on **Next >** twice, name the query **Profit calculation**, select the radio button for **Modify the query design**, then click on **Finish**.

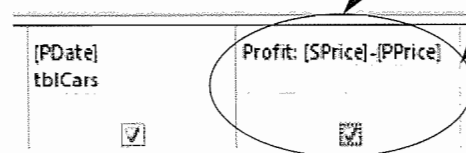


In the design view of the query, use the bottom scroll bar to scroll to the right and find the first blank field like this.

Move the cursor into the **Field** row for the first blank field. Enter the name (**Profit**) that you wish to give this calculated field followed by a colon. The colon tells *Access* that the next section is a calculation. Within the calculation, you must place square brackets **[]** around each fieldname so that *Access* looks up the data from the relevant field.

For this task, you need to subtract the purchase price from the sale price. The finished calculation will appear like this.

In the **Views** section select the **Datasheet View**. Calculate the profit for three or four cars by hand or using a calculator, and compare with the results in the query to check that you have entered the formula correctly.



The formatting of the calculated field will be performed in the report. The task requires you to create a second calculated field so it would be sensible to include the new field now and complete the formatting later.

#### Hint

Use + for addition,  
- for subtraction, \*  
for multiply and /  
for divide.

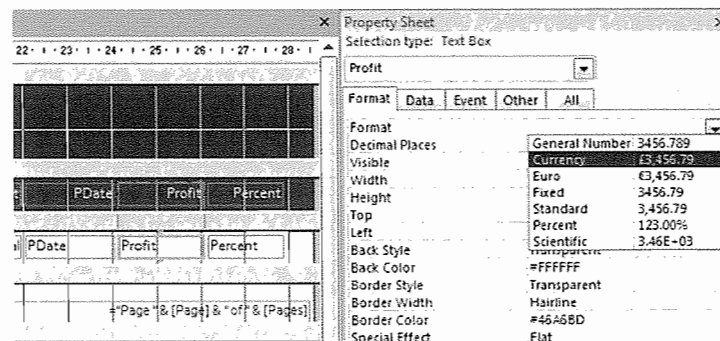
To create a new field called **Percent**, follow the same procedure, this time adding a formula to divide the profit by the sale price.

Again, check the calculations with a calculator to ensure that you have not made an error entering the formula. Save and close the query.

Create a new report using the **Report Wizard** as shown in Section 11.5. In the **Tables/Queries** box select the profit calculation query as the source of the data.

Select all fields using the double arrow key. Click on **Next >** three times before selecting a page **Orientation** of **Landscape**. Click on **Next >** twice more naming the report **Profit calculation**. Select the radio button for **Modify the report's design**, then click on **Finish**.

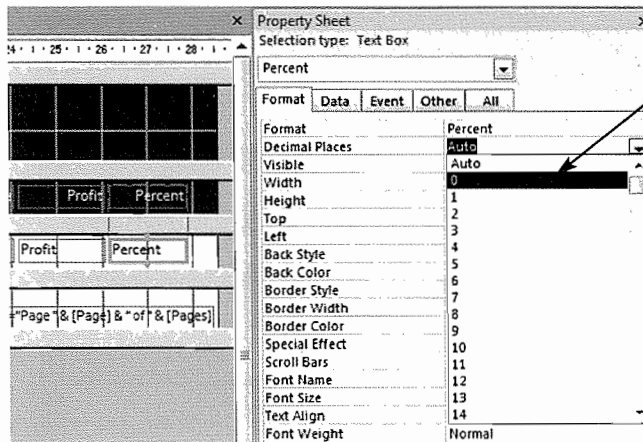
Move to the **Detail** row of the report and right mouse click on the control for the **Profit** data. Select **Properties** from the drop-down menu to display the **Property Sheet** pane.



Select the **Format** tab for this control, and use the drop-down menu for the **Format** option to select a **Currency** formatting style. Click on the **View** icon to go into **Report View** and check that the formatting for this field is correct and contains 2 decimal places. In this example it does.

Repeat this process for the **Percent** field, left mouse clicking on the control for **Percent** in the **Detail** row of the report. For this field select the **Percent** formatting style from the drop-down list. Again, go into **Report View** to check that the formatting for this field is correct and contains 0 decimal places. In this example, the data is displayed in with percentage formatting but has 2 decimal places.

Click on the **View** icon to return to **Design View**. Right click the mouse button on the **Percent** control in the **Detail** row. Find the **Decimal Places** option and select 0 from the drop-down list.



Go into **Report View** to check that the formatting for this field is now correct and contains 0 decimal places. This is fine, but some field widths need adjusting so that all data and labels are fully visible. Adjust these before saving the completed report.

### Activity 11i

Open the file saved in Activity 11h. Produce a new report from all the data which:

- contains a new field called **Profit** which is calculated at run time. This field will subtract the purchase price from the sale price
- contains a new field called **Percent** to calculate the percentage profit for each car at run time. This field will divide the profit by the sale price
- contains a new field called **UnitProfit**. This field will divide the profit by the quantity
- has the **Profit** and **UnitProfit** fields formatted to currency with 2 decimal places
- has the **Percent** field formatted as a percentage value with 1 decimal place.

## 11.7 Using formulae in reports

Other calculations may be needed on the data selected. These include calculating the sum (total), average, maximum or minimum values of selected data, or counting the number of items present in the selected data. All of these functions can be produced within a report in *Access*.

### Task 11q

Open the file saved in Task 11p.

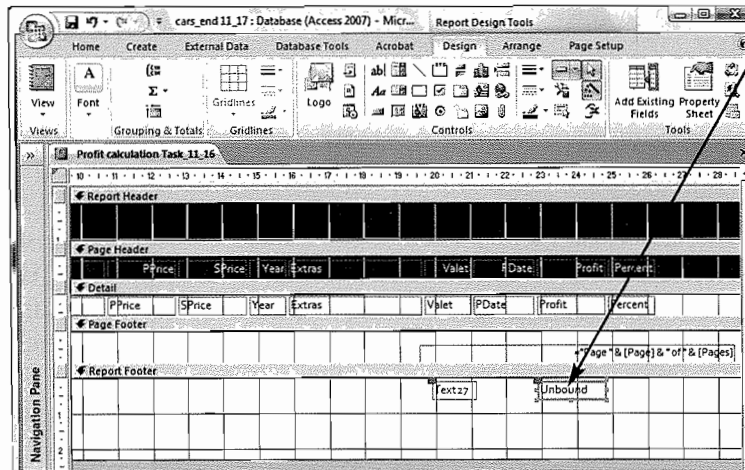
Produce a new report from all the data which:

- displays at the bottom of the report the total profit if all the cars were sold
- displays at the bottom of the report the maximum, minimum and average profit values
- displays the number of cars in this report.

You can use the report from Task 11p to help you with this task. Close this report (if it is open) and right mouse click on it once in the **Navigation** pane so that you get the drop-down menu. Select **Copy**, then **Paste** a new version into the pane with a name that relates to Task 11q. Open this report in **Design View**.

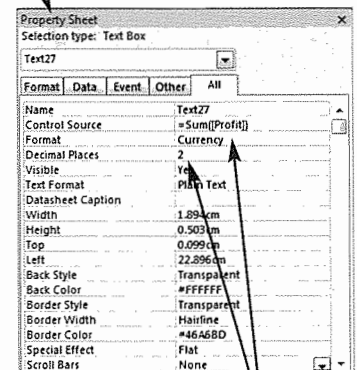
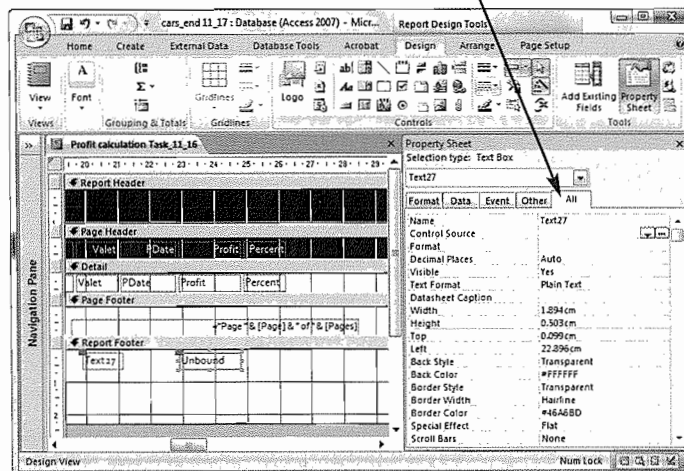


Click the left mouse button on the bottom edge of the **Report Footer** and drag this down about 2 centimetres, so that this footer is now visible. Select the **Design** tab and then click on the **Text Box** icon from **Controls** section. Move down into the



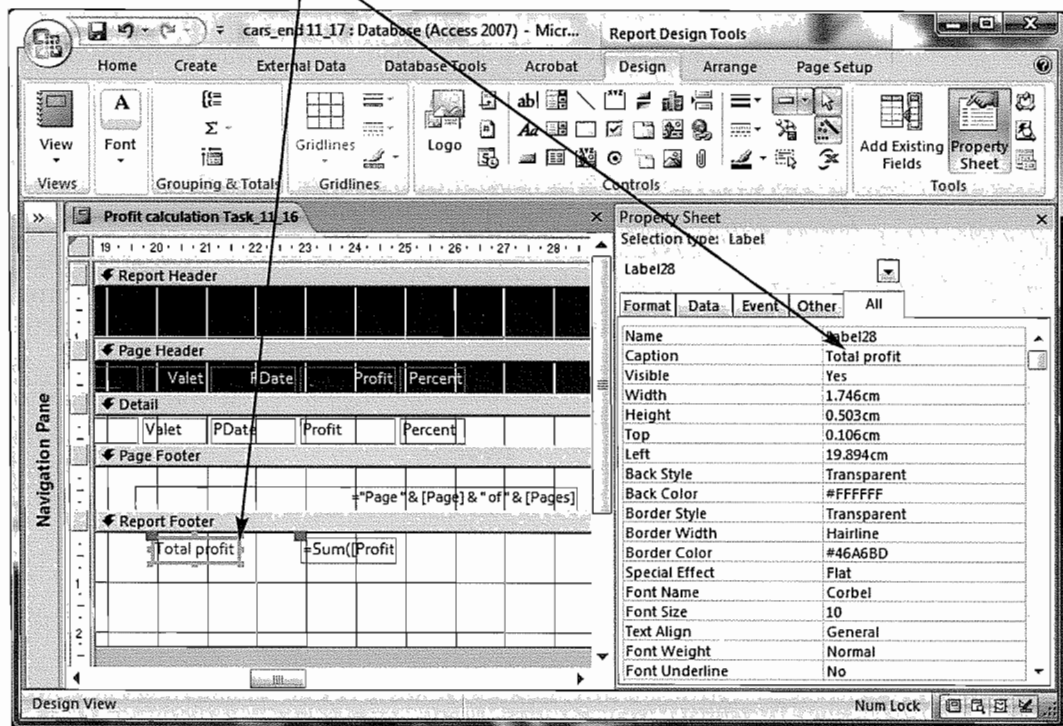
**Report Footer** and click the mouse button and drag to place a new control, in this case a text box directly below the **Profit** column. This positioning is important as this control will be used to calculate the total profit for the data in this report.

If the **Property Sheet** pane is not showing, right click the mouse button on the text box that you have just created, then select **Properties** from the drop-down menu. In the **Property Sheet**, select the **All** tab, find the **Control Source** row and type the formula **=SUM([Profit])** into this row. The **Property Sheet** will change to this.



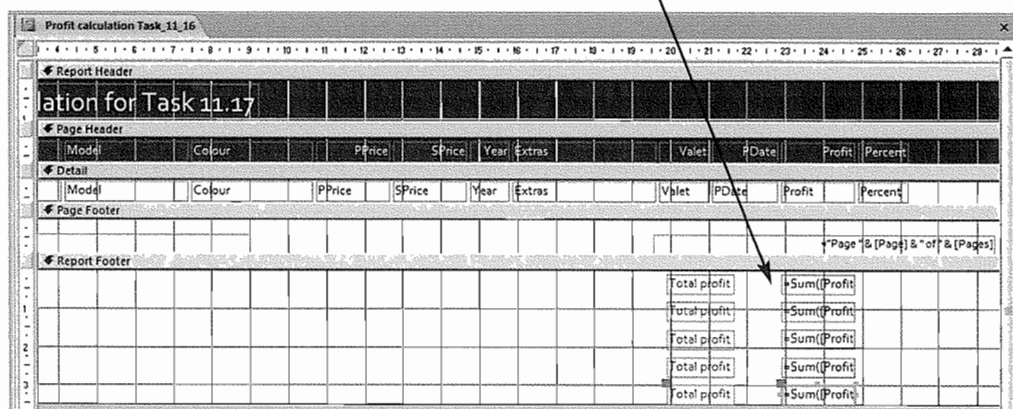
The round brackets are part of the SUM function, the square brackets tell Access that this is a field (in this case the **Profit** field calculated at run time). Format this control as **Currency** and set it to 2 decimal places.

Move the cursor into the label for this text box and type in the **Caption** 'Total profit'. This can be entered in the label or in the **Property Sheet** pane using the **Caption** row like this.



Change to the **Report View** and make sure that the control is in the correct place and appears to give the right answer (it is not too large or too small).

Rather than repeating this process four more times, it will be quicker to copy and paste these controls and edit each one to give the required results. Use the **lasso tool** to highlight both the **Text Box** and its **Label**. Click the right mouse button and select **Copy**, then click the right mouse button on the background in the **Report Footer** and use <Shift> and <Insert> to paste the copies of these controls. Using <Shift> and <Insert> pastes the new controls directly under the existing ones and you do not need to reorganise the controls. It also extends the bottom of the **Report Footer** as needed. If you right mouse click and use **Paste** from the drop-down menu, this pastes the controls in the top left-hand corner of the **Report Footer** and you then have to drag and position each set of controls. Repeat <Shift> and <Insert> until you have five sets of controls like this.



Total profit	=Sum([Profit])
Maximum profit	=Max([Profit])
Minimum profit	=Min([Profit])
Average profit	=Avg([Profit])
Number of cars	=Count([Profit])

the average profit so that it becomes =AVG([Profit]). In the final control to count the number of cars, change the formula so that it becomes =COUNT([Profit]). The controls should look like this.

In the **Property Sheet** pane for the final **Text Box**, change the format back from **Currency** to a **Standard** number. Set this control to 0 decimal places. Check the layout and calculations in **Report View**. The completed calculations look like this.

Alloy wheels	Yes	£2,700.00	11%
	No	£2,705.00	11%
Total profit		£86,920.00	
Maximum profit		£2,705.00	
Minimum profit		£600.00	
Average profit		£1,278.24	
Number of cars		68	

Save the report.

If you need to show evidence of the formulae that you used for the practical examinations, use screenshot evidence of the calculated controls.

### Hint

If you are using screenshot evidence of calculated controls, make sure that each control is wide enough to show all of the formulae in full. If you do not show all the formulae, marks will not be awarded.

### Activity 11j

Open the file saved in Activity 11i. Produce a new report from all the data which:

- displays at the bottom of the report the maximum and minimum percentage profit for all the items in stock
- displays at the bottom of the report the average profit per item
- displays the number of items in stock
- uses appropriate formatting for all data.

## 11.8 Sorting data

Although *Access* has the ability to sort your data in both tables and queries, it is easier to save the sorting until the data is produced in an *Access* report.

### Task 11r

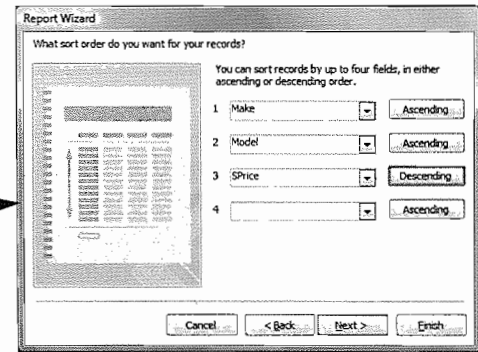
Open the database that you saved at the end of Task 11q. Produce a report which:

- displays all the data for the cars made by Ford or Vauxhall
- fits within the width of a single page
- is sorted into ascending order of make and model, then into descending order of sales price
- has your name in the report header followed by 'Ford or Vauxhall'.



You created the query in Task 11f. To produce this report, select the **Create** tab and click on the **Report Wizard** icon. In the **Tables/Queries** box select the Ford or Vauxhall query. Select all fields using the double arrow key and then click on **Next >** twice to obtain this view.

Use the drop-down lists to select the **Make** field, then the **Model** field and finally the **SPrice** field. For the **SPrice** field, click on **Ascending** to the right of this field and it will toggle (change) to **Descending**. When these fields have been set as shown, click on **Next >**. Set the **Orientation** to **Landscape** and run through the final stages of the wizard, giving this report a suitable name. This process is the same for other data types such as dates.



### Activity 11k

Open the file saved in Activity 11j. Produce a new report from all the data which:

- displays all the blue or black items
- fits within the width of a single page
- is sorted into ascending order of colour and type and then into descending order of description
- has your name in the report header followed by 'Black or blue items'.

## In this chapter you will learn how to:

- create an integrated document
- combine text and database extracts
- combine text and graphs or charts
- produce evidence of your methods
- ensure the consistency of display
- use precision framing.

For this chapter you will need these files from the CD:

- MEMO.RTF
- LETTER.RTF

For this chapter you will also need your worked copies of:

- |                |                |
|----------------|----------------|
| ■ Task 11e     | ■ Activity 10h |
| ■ Task 11q     | ■ Activity 10i |
| ■ Activity 10a | ■ Activity 10j |
| ■ Activity 10b | ■ Activity 10k |
| ■ Activity 10c | ■ Activity 10l |
| ■ Activity 10d | ■ Activity 10m |
| ■ Activity 10e | ■ Activity 10n |
| ■ Activity 10f | ■ Activity 11c |
| ■ Activity 10g | ■ Activity 11k |

## 12.1 What is an integrated document?

In the examination you may be asked to create a document that contains text and other objects. These may include:

- images including screenshots of your work
- data taken from a database or spreadsheet
- graphs or charts
- short pieces of html
- cascading stylesheets.

If you are asked to create a document, select your word processor, in this case *Microsoft Word*. Sometimes the word report is used instead of document, as mentioned in Section 11.5. This means 'a document that gives information'. It does not mean a report created in *Microsoft Access* (although there are times when it might be appropriate to use this) and will usually mean a report created using a word processor.

## 12.2 Importing objects

In Chapter 10 you learnt how to import and edit text from a file, clip art and images from a variety of different sources. Many of these skills will be needed in any integrated document that you produce.

**Hint**

Keyboard shortcuts:  
You can use <Ctrl>  
and <C> to copy to  
the clipboard and  
<Ctrl> and <V> to  
paste the current  
contents of the  
clipboard.

To import text from a website, open the webpage in a web browser, in this case *Internet Explorer*, and highlight the text that you wish to use. Right click the mouse within this highlighted text and select **Copy** from the drop-down menu. Move into the word processor and right click the mouse in the position you want to place the copied text. Select **Paste** from the drop-down menu.

The same method is used to copy an image into your document from a webpage. However, note that in most countries, **copyright** laws mean that it is illegal to copy any text or image from a website without the permission of the owner of the copyright. For the practical examinations, copyright of the material on the websites that you will be asked to use will be owned by CIE, or permission to use the material for the examination will have been obtained by CIE.

## 12.3 Showing evidence of your methods

In the practical examinations, you may need to show the examiners how you answered the question. Using a series of **screenshots** is the quickest and easiest way of doing this. A screenshot is where you 'capture' an image of what is displayed on the screen at the time. This is copied and stored temporarily in the **clipboard** of the computer and can be pasted into a document. As well as using these basic tools provided within the *Windows* environment, there are other ways of doing this. There are a number of packages available that will produce screenshots, some of which are available as freeware. If you are already know how to use one of these packages, using them may save time in the practical examination. Because there are so many different packages available and each works in a different way, they are not covered in this book.

To take a screenshot and capture an image of everything that is displayed on the screen at any time press the <Prt Scr> (or <Print Screen>) key on your keyboard. If you have more than one window open and wish to capture only the current window hold down the <Alt> key and press <Prt Scr>. Paste the contents of your clipboard into the word processor and edit the image (cropping and/or resizing, as described in Sections 10.7 and 10.8) to show only the sections that you require.

**Hint**

Make sure that the  
image you have  
captured can be  
seen clearly by the  
examiner.

## 12.4 Showing evidence from Access

You have already produced queries, reports and calculated controls in *Access* in Chapter 11, but it is not always easy to produce the evidence of this for the practical examinations. If you have created a report containing a tick box, always print this directly from the report or use screenshot evidence. If you try to export a report containing tick boxes in rich text format for example, the tick boxes will not be included in the exported document. If you use screenshots and the evidence is in more than a single screen, make sure that you take a number of screenshots showing all of the evidence.

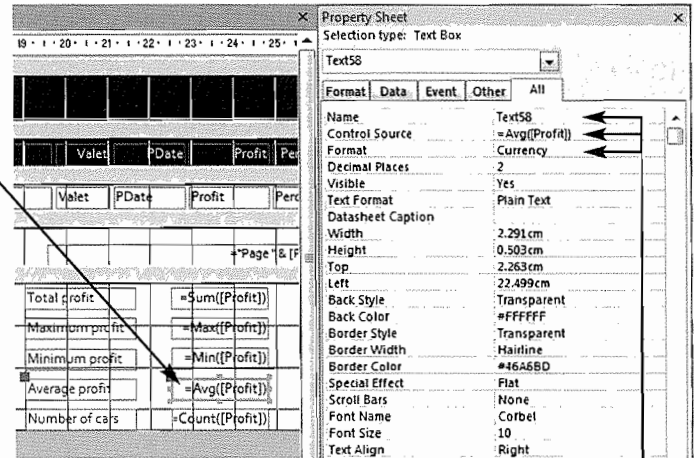
**Task 12a**

Open the file saved in Task 11q.

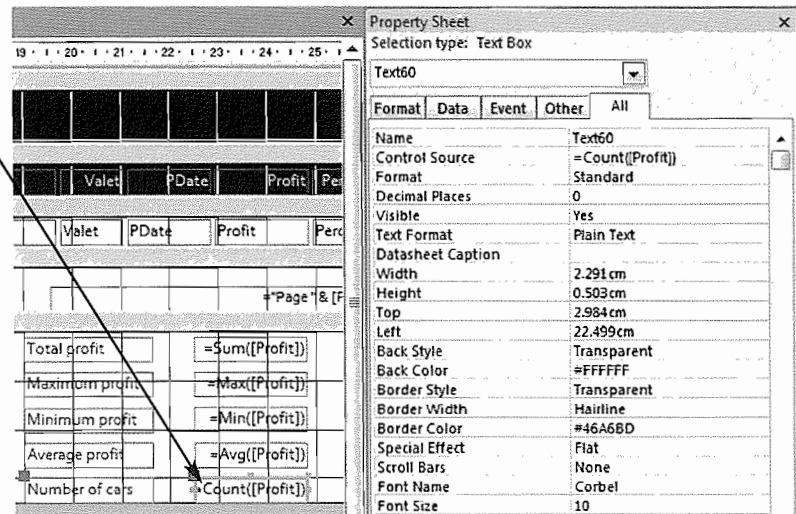
Show evidence of the formula and formatting used for the calculated controls for the 'Average profit' and 'Number of cars' within the report.

Open the report for Task 11q in **Design View**. Click the left mouse button on the **Text Box** containing the calculation for the average profit. If the **Property Sheet** pane is not visible, click the right mouse button on this control and select **Properties** from the drop-down menu. Select the **All** tab in the **Property Sheet** pane.

Screenshot the window using the <Prt Scr> key and paste this into a word-processed document. Crop the image so that the relevant sections can be seen. Enlarge the image so that the text can easily be seen, like this.



Repeat for the control for the number of cars. Left click on the **Text Box**, take another screenshot and paste this into your word-processed document. Again, crop and resize the image so that the relevant sections can be easily seen. Remember to add your name to the document before saving it.



### Hint

If you need to include an Access report in the document, perhaps because calculated totals are also required, export the report in .rtf format and insert this into the word-processed document using the techniques shown in Section 10.1.

### Activity 12a

Open the file saved in Activity 11k.

Show evidence of the formatting used for the **Quantity** and **PPrice** fields within the report to display the black or blue items.

## 12.5 Combining your document and a database extract

In the practical examinations you may need to take a database extract and place this into a word-processed document. Using an *Access* query rather than an *Access* report is often the easiest method of combining this information. Copying the query and pasting it into the document (as described below) gives instant results. Be careful to format the new text to match the existing document, to ensure the table fits within the margin (or column) settings and to maintain consistency of line spacing with the original document.

## Task 12b

Open the file MEMO.RTF and place only the **Make, Model, Colour, Year, Extras and Valet** fields of all the Ford cars that need valeting as a table after the text '... that need to be cleaned:'.

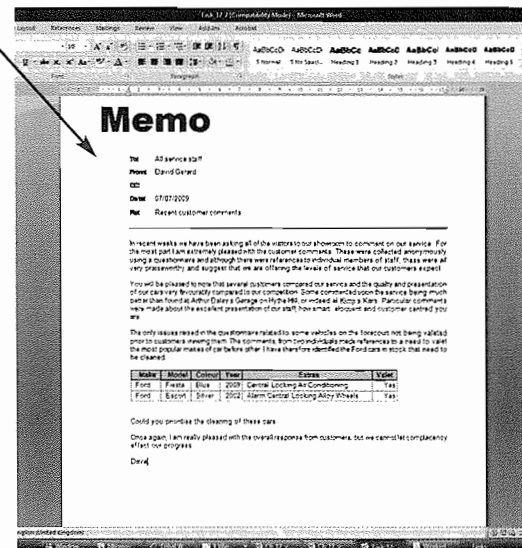
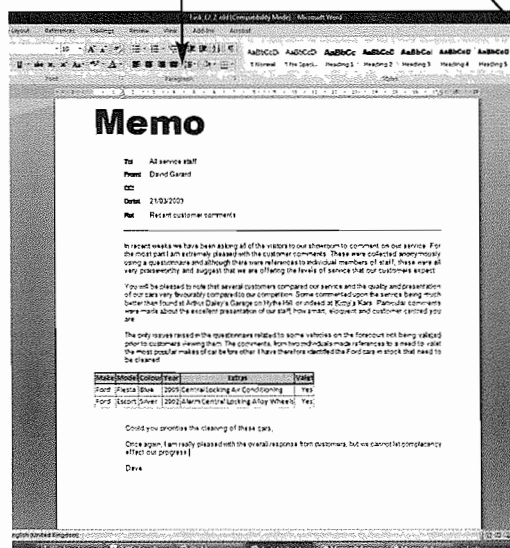
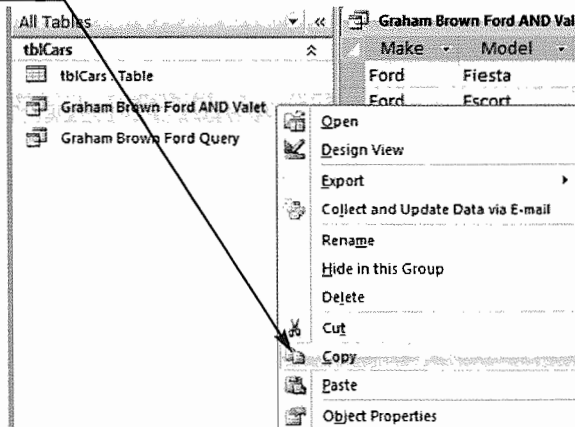
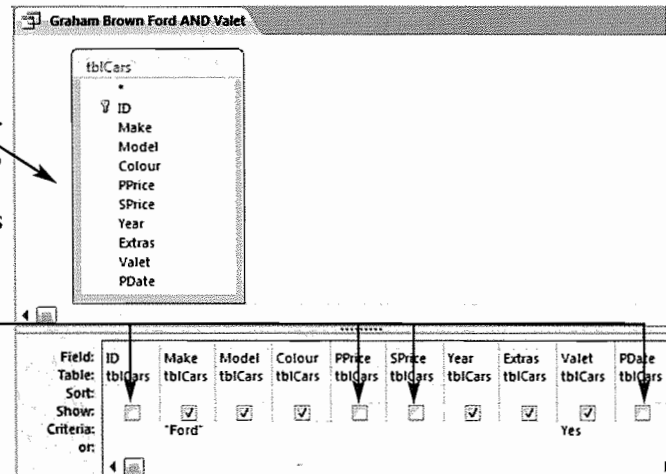
Open the database that you saved in Task 11c. Open the query for the Ford cars and valeting is Yes in **Design View**. In the **Show:** row of the query, click on the tick boxes to remove the ticks from the fields that you do not need in the extract.

Save the changes to the query and close the query. In the **Navigation** pane, right mouse click on this query and use the drop-down menu to select **Copy**.

Open the document MEMO.RTF in your word processor. Move the cursor to the end of the text '... that need to be cleaned:' and click the right mouse button. Select **Paste** from the drop-down menu.

The document now looks like this.

Delete the top row from the table, and move the table so that it aligns with the left margin of the document. To do this, click in the table and adjust the ruler settings for the table. Set the font style in the table so that it matches the text in the paragraphs. The document now looks like this.



### Activity 12b

Use the file that you saved in Activity 11c.

Extract all the items that are red and the discount is yes, and show all fields except PPrice.

Place this extract into the file LETTER.RTF after the text '...red in colour.'

## 12.6 Combining your document and a graph or chart

In the practical examinations, you may need to insert a graph or chart into a word-processed document. You should treat the graph or chart as an image and use the same methods, like copy and paste. Make sure that you have displayed all of the data and labels in full in your graph before copying it into the document. This will be shown in more detail in Chapter 14.

## 12.7 Ensuring consistency of display

It is very important that the finished integrated document looks like a single piece of work. Every part of a finished document should look the same in terms of font style, line and paragraph spacing, paragraph settings, margin settings and headers and footers. The headers and footers should align with the margin settings of the page, not the default settings for your word processor. When you include tables or database extracts in your document these should have the same margin setting and font styles as the body text. All bulleted and numbered lists should also appear in the same style. In the practical examination, if you are not very careful about this you are likely to lose a large number of marks. This can be relevant in a question that is assessing your knowledge and understanding, if a question asks you to prepare a report, document or presentation on a topic; you are likely to be marked on both the subject content and on the quality of the document that you produce.

## 12.8 Precision framing

Make sure that objects like tables and charts always fit precisely into the column or page margins, unless you are told in the question to do something different. Examiners are unlikely to allow more than 1 or 2 millimetres overlap if images or other objects fit outside the column width or margins.

### Activity 12c

Open each activity that you completed in Chapter 10. Check the consistency of presentation, page breaks and that all objects placed within a document fit precisely in the margins.

This activity does not have model answers on the CD.

**In this chapter you will learn how to:**

- use sequential numbering to save files
- save files in different formats
- print a draft copy of the final version of a document
- print e-mails with a file attachment
- print a table, query or report in a database
- print a graph or chart.

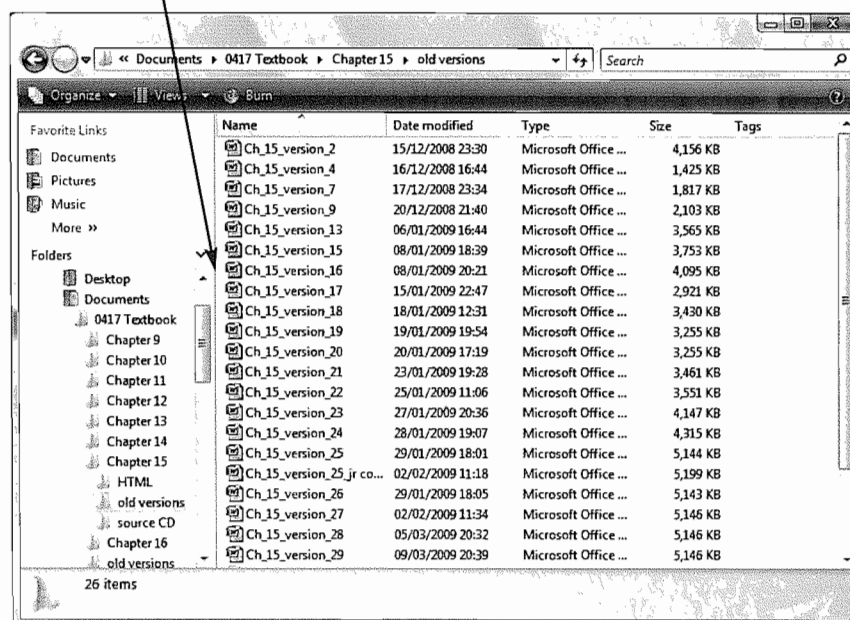
For this chapter you will need no additional materials.

## 13.1 Saving documents

### Version numbering

It is always wise to save each piece of work as you are producing it. You should save every 5 to 10 minutes, so that if there is a problem – a hardware fault or power cut for example – you only lose a few minutes' work.

It is always sensible to name your files with sequential numbers. For example, as each chapter of this book was being written, each was saved with a different version number so that different versions can be identified. When producing your work, if you want to go back to something from an earlier version, it is always available.

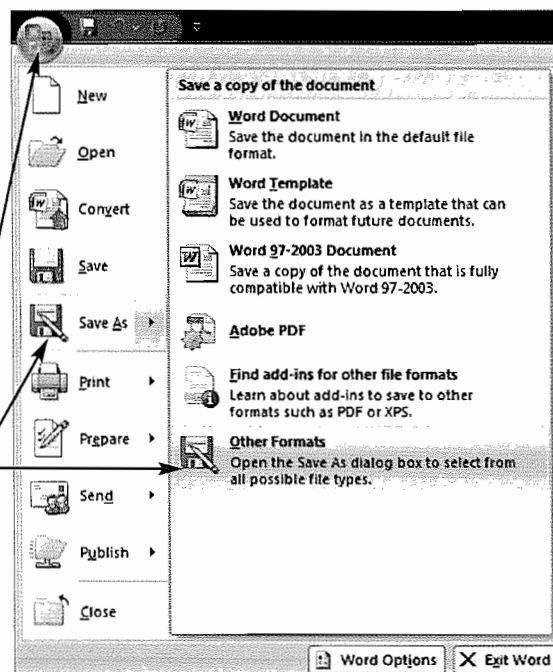


## Saving a document in different formats

Documents and data can be saved in different formats. In earlier chapters, you have learnt how to import different file types, and how to export using different data types in *Access*. Saving a document has already been covered in earlier chapters, but to save a document in a different file format, click on the **Office** button followed by **Save As** and select **Other Formats**.

This will open the **Save As** window and you can choose the file type using the **Save as type:** drop-down list. This list may vary from the one shown, depending upon the configuration of your software.

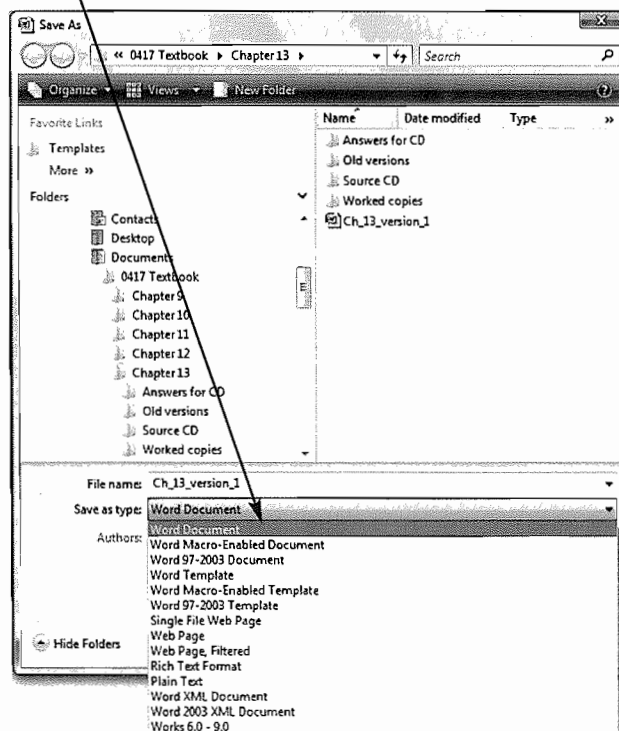
The most common formats that you may need to use are text format (listed as **Plain Text**), and **Rich Text Format**. Select the one that you require and click on **Save**.



## 13.2 Printing data and documents

For all of the different applications used for the practical examinations, you can use the **Office** button followed by **Print** and **Print Preview** to check that the object that you want to print is correct before sending it to the printer. Please note that *all* documents, data, graphs, charts, presentations, etc. must be clearly labelled with your name, centre number and candidate number in order for it to be marked.

Printing any document created in colour on a black-and-white printer can cause problems. This book has sections of coloured text designed to outline key elements; for example, words in the glossary are shown in red, instructions are in blue and





**Hint**

Not all property windows have these settings. Each will depend upon the printer that you have installed. In this case, the

**Document**

**Properties** window can also be used to change between **Color** and **Black & White** printing.

fieldnames are in orange. If a page containing these three colours was printed on a black-and-white printer, each of the three colours would appear as a similar shade of grey. It would be impossible to identify which words were glossary terms, instructions or fieldnames. The use of colour in images is equally important; some colours appear identical in greyscale, particularly colours like red and green. You must be able to change the colour settings within your documents, diagrams and charts to enable the different sections to be distinctive when they are printed in black and white.

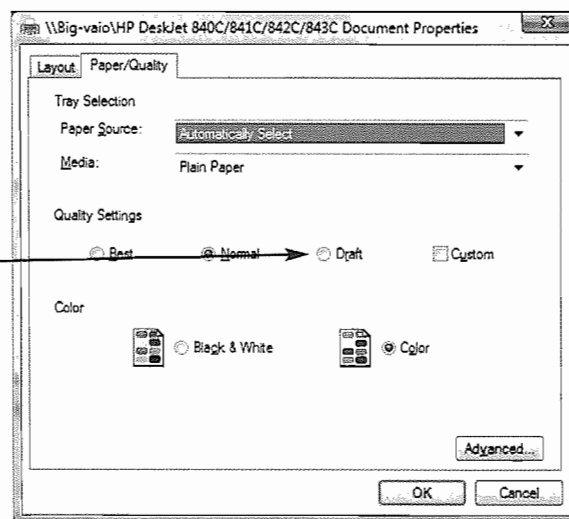
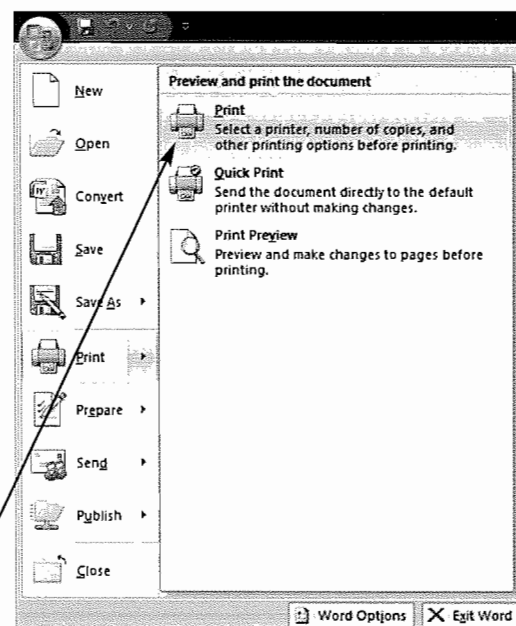
## Printing a draft copy or final version of a document

You have already practised many of the skills needed for this chapter. There is often no difference between a draft copy and a final copy of a document in terms of the way that it is laid out. In some cases, draft documents may be produced to a lower quality than final copies, so you do not waste expensive printer consumables. In the practical examinations, there will be no need to change your printer settings or include watermarks on your documents, unless you are asked to do so in the question paper. If the question paper asks you to show how to set a draft copy, click on the **Office** button followed by **Print** and select **Print** again from the new list to open the **Print** window.

Click on **Properties** to show the **Document Properties** or **Printing Preferences** window.

In the **Document Properties** window you can change the **Quality Settings** from the current value (in this case **Normal**) to **Draft**. You may need to screenshot this process as evidence for the examination.

Although this feature has been demonstrated using a document in the word processor, similar settings can be changed in other packages.

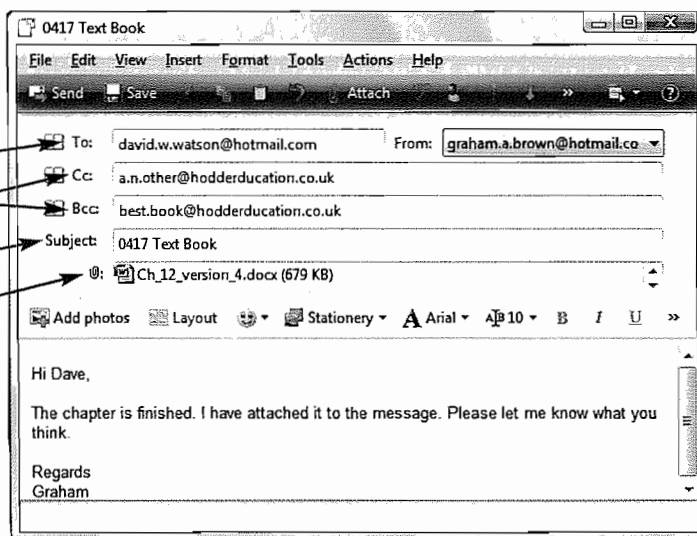
**Hint**

Always check that that the document that you are printing is free from errors before sending it to the printer. Use the **Print Preview** feature to help you.

## Printing emails with a file attached

Open your email browser or editor. Enter the address of the person that you are sending the message to in the **To:** box, and any copies in the **Cc:** and **Bcc:** boxes. Add the subject in the **Subject:** box and attach the file to the email.

The details of the file attachment should be visible within the window, along with the other items entered. The examiners will check very carefully that each of these items is correct. In this email the address, subject and attachment are all clearly visible. Check that there are no errors in the text of the email. If you need to send evidence of this as part of the practical examination, copy the screen using <Alt> and <Prt Scr>, before pasting this into a word-processed document.



## Printing from Microsoft Access

You have already covered many of the skills required for this in Chapter 11. This section shows you how to produce printouts of each area in *Access*. Do not forget that screenshots can be very useful as evidence, although documents containing a number of screenshots can be very large files and take a long time to print.

One way to print a table or query is to open the table or query, and copy and paste the data into a word-processed document. This document can be edited (to add your name and other details), saved and printed. A table or query can be printed directly from *Access* by double clicking on the table name or query name in the **Navigation** pane to open it and clicking on the **Office** button followed by **Print**.

Use a report in *Access* if you need to show calculated controls and improved page layout. Printing a report uses the same method as printing tables and queries. The report can be opened and printed using the **Office** button followed by **Print**. Reports can be exported for inclusion in a word-processed document as outlined in Chapter 11.

## Printing a graph or chart from Microsoft Excel

One way to print any graph or chart is to open the graph/chart, and copy and paste the graph/chart into a word-processed document. You can add your name, candidate number and centre number and any other text that you require before saving and printing. A graph or chart can be printed directly from *Excel* by opening the graph/chart and clicking on the **Office** button followed by **Print**.

**In this chapter you will learn how to:**

- create the layout for a spreadsheet model
- enter text and numeric data into a spreadsheet
- use editing functions such as cut, copy and paste
- enter formulae and simple functions into a spreadsheet
- replicate formulae and functions in the spreadsheet
- test the data model
- select subsets of data within a spreadsheet
- sort the data within the spreadsheet
- change the display and format of cells within a spreadsheet
- change the size of rows and columns within a spreadsheet
- adjust the page orientation
- save a spreadsheet
- print a spreadsheet displaying formulae or values
- create a graph or chart
- label a graph or chart
- extract segments from a pie chart
- add a secondary axis
- set axis scales
- change chart colours to print in black and white
- create, rename and delete files using an operating system
- access folders/directories within an operating system.

For this chapter you will need these source files from the CD:

- |                 |                |
|-----------------|----------------|
| ■ CLASSLIST.CSV | ■ ROOMS.CSV    |
| ■ CLIENT.CSV    | ■ SALARY.CSV   |
| ■ CLUBS.CSV     | ■ SALES.CSV    |
| ■ COSTS.CSV     | ■ STAFF.CSV    |
| ■ EMPLOYEES.CSV | ■ TASKS.CSV    |
| ■ ITEMS.CSV     | ■ TEACHERS.CSV |
| ■ JOBS.CSV      | ■ TUCKSHOP.CSV |
| ■ OPERATORS.CSV | ■ TUTORS.CSV   |
| ■ PROJECT.CSV   | ■ WEBHITS.CSV  |
| ■ RAINFALL.CSV  |                |

## 14.1 What is a data model?

For data analysis, you will use a **spreadsheet model** to explore different possible answers. These models are often financial, mathematical or scientific. It is sometimes called using a 'what if' scenario or 'what if' modelling. It lets you change data in the spreadsheet to see what will happen to the results. In the practical examinations, you may be asked to build a simple spreadsheet model and change data within the model, or even change the model itself, to produce different results.

**Hint**

Remember that a column holds up the roof and you can see a row of houses.

**Spreadsheet basics**

	A	B	C	D	E	F
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

You will use the spreadsheet *Microsoft Excel* to create your data model. A spreadsheet is a two-dimensional table split into rows and columns. It looks like this.

It is made up of a number of individual cells, like this. This cell (with the darker outline) is the cell that has the cursor within it. To help us to use individual cells in a

spreadsheet, each cell has an address. In this example the cell with the cursor in it is called cell E9 and the cell that has been coloured red is called cell C4. The red cell and all of the yellow cells are in column C, and the red cell and all of the blue cells are in row 4.

**Task 14a**

Create a spreadsheet to multiply any two numbers together and display the result.

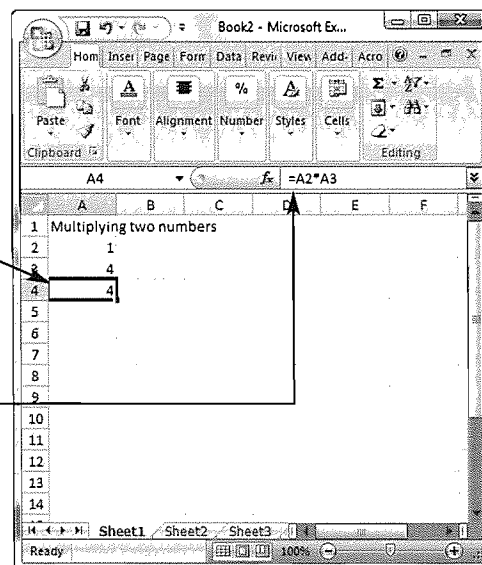
Each cell in a spreadsheet can hold one of three things. It can contain:

- a **number**
- text, which is called a **label**
- a **formula**, which always starts with an = sign.

Move the cursor into cell A1 and click the left mouse button. Type in the label 'Multiplying two numbers'. Move the cursor down into cell A2 and enter a number. Repeat this for cell A3. In cell A4, enter the formula  $=A2*A3$  so that the spreadsheet looks like this.

You will see that the formula is not visible in the sheet and that the cell A4 only contains the answer to the calculation within this cell. The formula for the cell containing the cursor can be seen in the formula bar.

If you have created the spreadsheet as shown, you should be able to change the contents of cells A2 and A3 to multiply any two numbers together. The changing of cells to see the results is called **modelling**.



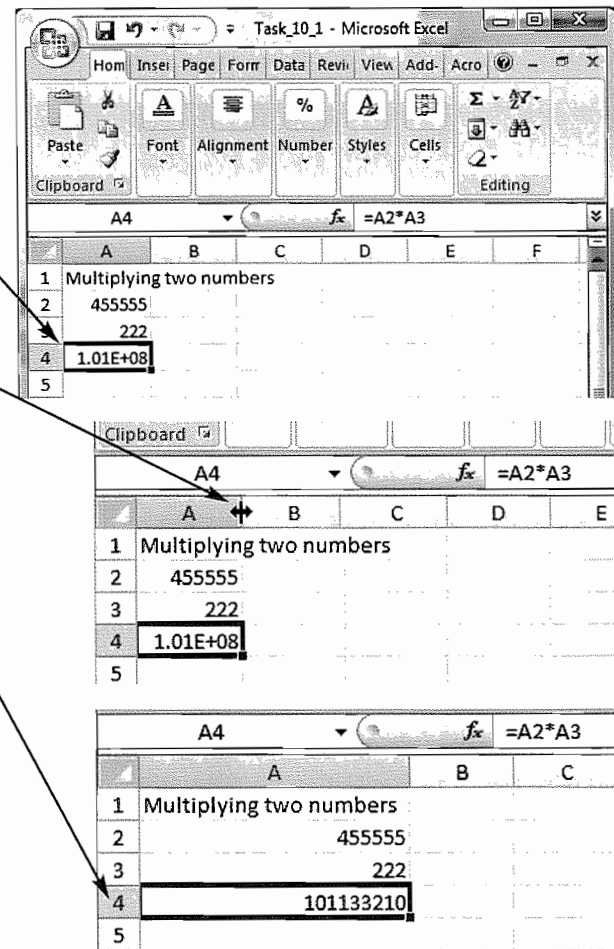
If you enter large numbers into cells A2 and A3 the result in cell A4 may not appear as you expect it to. It may look like this.

This tells you that the number is too large to fit into the column. To expand the width of column, move the cursor to the end of the column heading for column A like this.

Double click the left mouse button to expand the column width to fit the longest item stored in this column. The spreadsheet now looks like this. You can see how the label and all of the data are fully visible.

### Hint

If you do not show all of the contents of the cells in your practical examinations you will lose a significant number of marks.



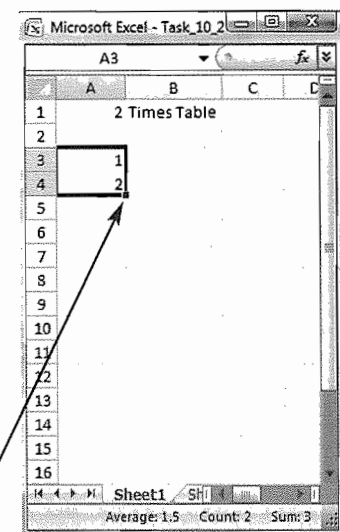
## 14.2 Creating a data model

### Task 14b

Create a spreadsheet to display the times table for any number you choose to enter. Print your spreadsheet, showing values and formulae.

For this task, you need to design and create the data model to calculate and display the times table for any number that you choose. You must therefore have a single cell that contains the number to use for all the calculations. In this model you can place a simple number like 2 in cell A1, so that you can easily tell if you have made a mistake with your formulae later on. Type the label 'Times Table' in cell B1.

You are going to create the times table in cells A3 to B12, with those cells in column A holding the number to multiply by and those cells in column B holding formulae to calculate the answer. Move the cursor into cell A3 and enter the number 1. Move into cell A4 and enter the number 2. Rather than repeating this process another eight times for the numbers 3 to 10, highlight the cells A3 and A4, as shown here. Move the cursor to the drag handle in the bottom right corner of these cells.



Click and hold the left mouse button on the drag handle, dragging it down to the bottom right corner of cell A12. This replicates (copies) the cell contents. *Excel* realises that the numbers in cells A3 and A4 increase by 1, so uses this pattern as it replicates the cells down.

### Hint

Make sure that your name (and in the examination your candidate details) are included in either the header or footer. To do this use the Insert tab, in the Text area select the icon for Header and Footer and enter your details in the relevant section.

	A	B	C	D
1				
2				
3	1			
4	2			
5	3			
6	4			
7	5			
8	6			
9	7			
10	8			
11	9			
12	10			
13				
14				
15				
16				

	A	B	C	D
1				
2				
3	1	2		
4	2	4		
5	3	6		
6	4	8		
7	5	10		
8	6	12		
9	7	14		
10	8	16		
11	9	18		
12	10	20		
13				
14				
15				
16				

Move the cursor into cell B3 and enter the formula `=A3*$A$1`. The \$ symbols in the reference to cell A1 will be used by *Excel* to keep that cell reference the same when this cell is replicated into cells B4 to B12. Use the drag handle in cell B3 to replicate this formula into the cells down to B12. The results should look like this.

Without checking the formulae, you can see that this has produced the correct results for the two times table. Change cell A1 to another number to check that the formula works correctly. Print this values view of the spreadsheet using the **Office** button, followed by **Print** and then **Print** again.

## Displaying formulae

To display (and then print) the formulae used in the spreadsheet, select the **Formulas** tab and find the **Formula Auditing** section. Click on the **Show Formulas** icon. The spreadsheet now looks more like this.

Each of these formulae contains both absolute and relative referencing. In cell B3, the reference to cell A1 (with the \$ symbols) is an **absolute reference** and the reference to cell A3 is a **relative reference**. You can see from this view that the reference in cell B3 to cell A3 has been changed as the cell has been replicated, as it uses relative referencing, but the reference to cell A1 has not been changed during the replication, because absolute referencing has been used.

To return to the view of the spreadsheet that shows the values, click on the **Show** **Formulas** icon again.

	A	B	C	D
1	2	Times Table		
2				
3	1	<code>=A3*\$A\$1</code>		
4	2	<code>=A4*\$A\$1</code>		
5	3	<code>=A5*\$A\$1</code>		
6	4	<code>=A6*\$A\$1</code>		
7	5	<code>=A7*\$A\$1</code>		
8	6	<code>=A8*\$A\$1</code>		
9	7	<code>=A9*\$A\$1</code>		
10	8	<code>=A10*\$A\$1</code>		
11	9	<code>=A11*\$A\$1</code>		
12	10	<code>=A12*\$A\$1</code>		
13				
14				
15				
16				

## More editing tools

Other standard *Windows* editing tools can be used in *Excel*, like cut, copy and paste. These can be used to copy the contents of one cell into another cell. An alternative method of replicating cell B3 into cells B4 to B12 is to enter the formula in cell B3, right mouse click on this cell and select **Copy** from the drop-down menu. Highlight the cells B4 to B12 and right mouse click, selecting **Paste** from the drop-down menu. This will paste the formulae, adjusting the cell references for A3 as this is a relative reference but retaining the absolute reference. The result is identical.

## Accuracy of the data entry

When you are asked to 'create a data model that looks like this', make sure that you copy the model in the question paper exactly as shown. Do not try to make improvements or add enhancements (like colour and formatting) unless asked to do so. This is very important. Some students lose marks by trying to 'improve' the spreadsheet, for example by trying to left align a column containing numbers. *Excel*, quite correctly, should automatically right align numbers, so by left aligning this data it is now formatted incorrectly. Do not insert rows or columns, or remove rows or columns containing blank spaces, unless instructed to do so.

When you type data into a spreadsheet (or any other form of document) you must make sure that the data that you have entered is identical to the original source document or examination question paper. A large number of marks can be lost by rushing the data entry and not checking that it has been entered with 100 per cent accuracy. This is even more important when working in a spreadsheet because one error, for example a mistyped number or decimal point in the wrong place, could cause all of the data in the spreadsheet to be incorrect. Care must also be taken when entering a formula, as one small error is likely to stop the spreadsheet working as it is expected to.

## Using formulae

Simple mathematical operators can be used to add, subtract, multiply, divide and calculate indices (powers) of a number. Each mathematical operator is placed in a formula, as you did in Tasks 14a and 14b. For addition use the + symbol, for subtraction use the – symbol, for multiplication use the \* symbol and for division use the / symbol. Indices are calculated using the ^ symbol, so the contents of cell A2 squared ( $x^2$ ) would be typed as =A2 ^ 2.

### Task 14c

Open the file OPERATORS.CSV. Place two numbers of your choice in cells B1 and B2. Calculate in cell:

- B4, the sum of the two numbers
- B5, the difference between the two numbers
- B6, the product of the two numbers
- B7, the contents of cell B1 divided by the contents of cell B2
- B8, the contents of cell B1 to the power of the contents of cell B2.

Check that the formulae have worked before printing your spreadsheet showing the values and again showing the formulae used.

Open the file OPERATORS.CSV in *Excel*. Extend the width of column A so that all the labels are fully visible (see Task 14a). Move the cursor into cell B1 and enter the number 4, then into cell B2 and enter the number 2. These numbers have been chosen so that you can easily check your calculations. It is wise to perform all calculations by hand before entering the formulae, to make sure that you understand the formulae that you are using and to see the results of the calculation before the computer has shown you its results. These calculations may look like this.

Number X	4
Number Y	2
$X + Y$	$4 + 2 = 6$
$X - Y$	$4 - 2 = 2$
$X * Y$	$4 * 2 = 8$
$X/Y$	$4/2 = 2$
$X ^ Y$	$4 ^ 2 = 16$

#### Hint

The ^ symbol is often found using <Shift> and '6'.

- **Addition:** Move the cursor into cell B4. The sum of the two numbers is needed in this cell, which means to add the contents of the two cells. There are two ways of doing this: one method uses the + operator and the second uses a function. You will be shown how to use the SUM function later in this chapter, but the formula needed to enter in this cell for the + operator is  $=B1+B2$ . This can be typed in followed by the <Enter> key, or you can type the = sign, click the cursor into cell B1, type + and click in cell B2 before pressing the <Enter> key.
- **Subtraction:** Move the cursor into cell B5. The difference between two numbers is needed in this cell. Enter (using either of the methods described in the addition section above) the formula  $=B1-B2$ , followed by the <Enter> key.
- **Multiplication:** Move the cursor into cell B6. The product of two numbers means to multiply the two numbers together and you need to enter the formula  $=B1*B2$ , followed by the <Enter> key.
- **Division:** Move the cursor into cell B7. This cell needs a calculation to divide the contents of cell B1 by the contents of cell B2 using the formula  $=B1/B2$ , followed by the <Enter> key.
- **Indices:** Move the cursor into cell B8. This cell needs to calculate the contents of cell B1 to the power of the contents of cell B2 using the formula  $=B1 ^ B2$ , followed by the <Enter> key.

To check that the formulae have worked correctly, compare your original paper-based calculations with the values in the spreadsheet.

You will notice that the values chosen earlier in this task were carefully selected to make the maths easy. The more difficult calculations are likely to be the division and indices. These numbers were selected so that the 4 divided by 2 gives an easy result and the 4 to the power of 2 is reasonably easy ( $4*4$ ).

Print the values, making sure that your name is fully visible on the printout. Select the **Formulas** tab, then click on the **Show Formulas** icon in the **Formula Auditing** section to change the display to show the formulae, which should appear like this. Save and print the spreadsheet.

	A	B	C
1	First number - X	4	
2	Second number - Y	2	
3			
4	Sum of X and Y	6	
5	Difference between X and Y	2	
6	Product of X and Y	8	
7	X divided by Y	2	
8	X to the power Y	16	

	A	B
1	First number - X	4
2	Second number - Y	2
3		
4	Sum of X and Y	$=B1+B2$
5	Difference between X and Y	$=B1-B2$
6	Product of X and Y	$=B1*B2$
7	X divided by Y	$=B1/B2$
8	X to the power Y	$=B1^B2$
9		



## Named cells and ranges

When an individual cell or an area of a spreadsheet is going to be used a number of times within the formulae of a spreadsheet, it is often a good idea to give it a name. This name should be short and meaningful. In the case of a large spreadsheet, it is easier to remember the name of a cell, for example VAT or AveMiles, rather than trying to remember the cell reference, for example AC456 or X232. Once a cell or a range of cells has been named, you use this name in all your formulae.

### Task 14d

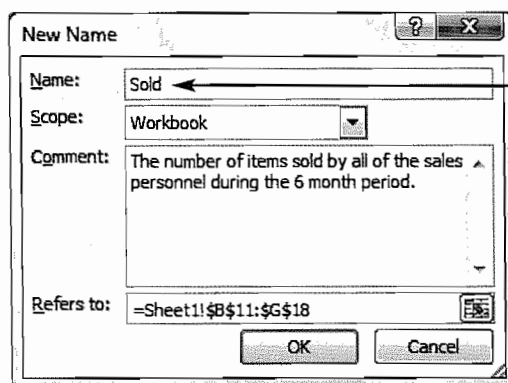
Open the file SALES.CSV. This spreadsheet will be used to calculate bonus payments to sales staff for a small company.

Name cell B1 'Unit'. Name cells A5 to C7 'Rate'. Name cells B11 to G18 'Sold'.

Open the file and find cell B2. You must name this cell 'Unit'. Right click on the mouse in this cell to get the drop-down menu. Select the option to **Name a Range...** which will open the **New Name** window. In the **Name:** box, *Excel* will suggest a name for the range. It uses the layout of your spreadsheet to do this. For the practical examinations, ignore this suggestion (in this case the name that it suggests is too long to be used) and overwrite it with the word **Unit**, as instructed in the question. Add suitable text in the **Comment** box so that the window looks like this. To name the range click on **OK**.

When you move the cursor into cell B1, you will see in the **Name Box** that it is now called **Unit**.

To create the named range for the rate, you must highlight the cells between A5 and C7. Do this by clicking on cell A5 and whilst holding down the left mouse button, dragging the cursor to cell C7. Click the right mouse button within the highlighted range to get the drop-down menu. Change the contents of the **Name:** box to **Rate**. Check that the **New Name** window looks like this before clicking on **OK**. The name of the range is only visible in the **Name Box** if only the cells in the range are highlighted.



The final named range can be created in a similar way. Highlight cells B11 to G18, then name this range **Sold**. Each of these named cells and ranges will be used in other tasks. Save this spreadsheet as Task\_14d as an *Excel* spreadsheet.

## Using functions

A formula in *Excel* starts with an = sign. It could be a simple formula using mathematical operators like  $=B1+B2$ , a complex formula using nested statements (this will be explained later in this chapter) or a formula including functions. A function has a pre-defined name like **SUM** or **AVERAGE** that perform a particular calculation. There are many of these functions in *Excel*, many of which are beyond the scope of this book, but each has a reserved function name. If a question asks you to choose your own name for a cell or range, try to avoid using these function names. This section does not contain all of the functions available or all those that may be used in the examinations.

### SUM

The SUM function adds two or more numbers together. In Task 14c, you used the mathematical + operator and the formula  $=B1+B2$  to add the contents of two cells together. With only two cells to be added, this was the most efficient way of doing this. If there had been more figures to add, particularly if they were grouped together in the spreadsheet, using the SUM function would have been more efficient.

### Task 14e

Copy this spreadsheet model and calculate:

- the total number of hours worked by all of these five people
- the average number of hours worked per person
- the maximum number of hours worked by any of these five people
- the minimum number of hours worked by any of these five people.

	A	B
1	<b>Rate of Pay</b>	£12.80
2		
3	<b>Name</b>	<b>Hours</b>
4	David Watson	26
5	Graham Brown	20
6	John Reeves	17
7	Brian Sargent	4
8	Dan Bray	13
9	<b>Total</b>	
10	<b>Average</b>	
11	<b>Maximum</b>	
12	<b>Minimum</b>	

### Hint

An alternative method is to enter  $=SUM($  then drag the cursor to highlight cells B4 to B8, then type  $)$  and press the enter key.

Open a new sheet and copy the labels and values exactly as shown in the task. Select the **Home** tab and use the (bold) icon to embolden the cells shown. To find the total number of hours worked you will need to click the cursor into cell B9 and use SUM to add up the list of numbers. Enter the formula  $=SUM(B4:B8)$ . This should give the value 80.

The screenshot shows an Excel spreadsheet with the following data:

	A	B	C	D
1	Rate of Pay	£12.80		
2				
3	Name	Hours		
4	David Watson	26		
5	Graham Brown	20		
6	John Reeves	17		
7	Brian Sargent	4		
8	Dan Bray	13		
9		=SUM(B4:B8)		
10	Average	SUM(number1, [number2], ...)		
11	Maximum			

A callout box from the Excel ribbon's **Home** tab, **Editing** group, points to the **AutoSum** button (represented by a sigma symbol).

An alternative way to use this function without typing it into cell B9 is for you to use **AutoSum**. Move the cursor into cell B9, select the **Home** tab and find the **Editing** section. Click on the **AutoSum** icon. This will place the SUM function into cell B9 and attempt to work out which cells you wish to add up (by looking at the layout of your spreadsheet). It does not always get this range correct, so check carefully. If the range is correct (as it is in this case) press the <Enter> key to accept the **AutoSum**. If it is not correct, you can highlight the cells to be added before pressing the <Enter> key.

There are many ways of using the SUM function, some of which are shown in Table 14.1.

Function	Equivalent formula	What it does
=SUM(B4:B8)	=B4+B5+B6+B7+B8	Adds up the contents of all the cells in the range B4 to B8
=SUM(D3,D8,D12)	=D3+D8+D12	Adds up the contents of the cells D3, D8 and D12
=SUM(D5:D8,F2)	=D5+D6+D7+D8+F2	Adds up the contents of the cells in the range D5 to D8 and the contents of cell F2
=SUM(MyRange)	None	Adds up the contents of all the cells within a named range called MyRange; this can be used with any named range

Table 14.1 Ways of using the SUM function

As you can see, the range of cells selected within these functions can include a number of individual cells, ranges of cells, named ranges, named cells or a combination of these. The average, maximum, minimum and count functions also work like this.

## AVERAGE

To find the average number of hours worked, click the cursor into cell B10 and use **AVERAGE** to calculate the mean (average) of a list of numbers. Enter the formula **=AVERAGE(B4:B8)**. This should give the value 16. There are many ways of using the **AVERAGE** function, some of which are shown in Table 14.2 overleaf.

Function	Equivalent formula	What it does
=AVERAGE(B4:B8)	=(B4+B5+B6+B7+B8)/5	Calculates the mean of the cells in the range B4 to B8
=AVERAGE(D3,D8,D12)	=(D3+D8+D12)/3	Calculates the mean of the cells D3, D8 and D12
=AVERAGE(D5:D8,F2)	=(D5+D6+D7+D8+F2)/5	Calculates the mean of the cells in the range D5 to D8 and cell F2
=AVERAGE(MyRange)	None	Calculates the mean of the cells in a named range called MyRange

Table 14.2 Ways of using the AVERAGE function

**MAX**

To find the person who worked the most hours, click the cursor into cell B11 and use **MAX** to select the largest (maximum) figure within the list of numbers. Enter the formula =**MAX(B4:B8)**. This should give the value 26.

**MIN**

To find the person who worked the least number of hours, click the cursor into cell B12 and use **MIN** to select the smallest (minimum) figure from the list. Enter the formula =**MIN(B4:B8)**. This should give the value 4. The finished spreadsheet should look like this. Save this spreadsheet as Task\_14e.

	A	B
1	<b>Rate of Pay</b>	£12.80
2		
3	<b>Name</b>	<b>Hours</b>
4	David Watson	26
5	Graham Brown	20
6	John Reeves	17
7	Brian Sargent	4
8	Dan Bray	13
9	<b>Total</b>	<b>80</b>
10	<b>Average</b>	<b>16</b>
11	<b>Maximum</b>	<b>26</b>
12	<b>Minimum</b>	<b>4</b>

**Activity 14a**

Open the file TUCKSHOP.CSV.

In cells B14 to B17, calculate the total number of days that all the students worked in the school shop, the average number of days worked, and the maximum and minimum values. Place your name on the spreadsheet. Print your spreadsheet showing the values. Print your spreadsheet showing the formulae used.

**Hint**

Setting a cell as an integer value will truncate the contents of a cell to remove the decimal/fraction part of the number. This is *not* the same as formatting a cell to 0 decimal places which stops the decimal/fraction part from being displayed but not from being used in a calculation.

**Task 14f**

John Reeves did an extra four hours' work. Change the spreadsheet that you created in Task 14e to show the new figures. The manager wants to see the average number of hours worked displayed as:

- an integer value
- rounded to the nearest whole hour.

Print two copies of the spreadsheet showing these values.

Open the file Ch\_14\_Task\_14e. Change the contents of cell B6 to 21 to add the four extra hours that he worked. This gives an average value of 16.8 hours. Move the cursor into cell C9 and enter the text 'Integer', then move into cell D9 and enter the text 'Rounding'. To get the first value requested by the manager, we have to set cell B10 to hold an integer value.

## INT

In mathematics, an integer is the word used to describe a whole number (with no decimals or fractions). Within *Excel*, the **INT** function takes the whole number part of a number and ignores all digits after the decimal point. Move the cursor into cell C10 and enter the formula **=INT(B10)**. This should give the value 16.

## ROUND

Move the cursor into cell D10 and enter the formula **=ROUND(B10,0)**. This uses the **ROUND** function which takes the content of cell B10 and rounds the number to 0 decimal places: if the next digit is five or more the number will be increased by one. For example, in cell B10 the value is 16.8, so the content of D10 is 17, as it has rounded the value to the nearest whole number. The spreadsheet should look like this.

	A	B	C	D
1	Rate of Pay	£12.80		
2				
3	Name	Hours		
4	David Watson	26		
5	Graham Brown	20		
6	John Reeves	17		
7	Brian Sargent	4		
8	Dan Bray	13		
9	Total	80	Integer	Round
10	Average	16	16	17
11	Maximum	26		
12	Minimum	4		

Rounding can be used with a number of decimal places, for example using rounding for currencies with 2 decimal places can avoid calculation errors. Table 14.3 shows more examples of how you can use the **ROUND** function, using cell A1 which contains the number **62.5512**.

Function	Result of rounding	What it does
=ROUND(A1,2)	62.55	Rounds the contents of A1 to two decimal places
=ROUND(A1,1)	62.6	Rounds the contents of A1 to one decimal place. Note that the figure 5 in the 62.5512 has forced the previous figure to be rounded up
=ROUND(A1,0)	63	Rounds the contents of A1 to no decimal places. Note that the figure 5 in the 62.5512 has forced the previous figure to be rounded up
=ROUND(A1,-1)	60	Rounds the contents of A1 to the nearest 10. The negative value for decimal places allows this function to round numbers in tens, hundreds, etc.
=ROUND(A1,-2)	100	Rounds the contents of A1 to the nearest 100. Note that the figure 6 has forced the previous figure to be rounded up from 0 to 1

Table 14.3 Ways of using the **ROUND** function

Save and print a copy of the spreadsheet showing the average number of hours worked displayed as an integer value. Print a copy of the spreadsheet showing the average number of hours worked rounded to the nearest whole hour.

### Activity 14b

Create a new spreadsheet model to calculate:

- the whole number part of 375.56411
- 375.56411 rounded to two decimal places
- 375.56411 rounded to the nearest whole number
- 375.56411 rounded to the nearest ten
- 375.56411 rounded to the nearest hundred
- 375.56411 rounded to the nearest thousand.

### Task 14g

Open the file PROJECT.CSV. This file lists some workers and below each worker is the number of jobs they have still to finish for a project.

Place a formula in cell A22 to count the number of jobs that still have to be finished for the project. Place a formula in cell A24 to count the number of workers on the project.

### COUNT

For this task you will need to use functions that count different values. It is possible to count the number of numeric (number) values in a list using the **COUNT** function. Open the file, place the cursor in cell A22 and enter the formula **=COUNT(A2:A19)**. This will look at the range A2 to A19 (notice that you have not counted cell A1 which contains the title, nor cell A20 that may be used for something else later) and count only the cells with numbers in them. It will not count any blank spaces and should give the value 7.

### COUNTA

The **COUNTA** function works in a similar way to the **COUNT** function. Rather than counting just the number of numeric values, this function counts the number of numeric or text values displayed in the cells. It will not count any blank cells within the range. In *Excel* there is not a count function for just text values, so the **COUNTA** and **COUNT** functions will both be used to calculate the number of workers on the project. Place the cursor in cell A24 and enter the formula **=COUNTA(A2:A19)-COUNT(A2:A19)**. This will look at the range A2 to A19 and count the cells with text or numbers in them, then subtract the number of cells with numbers in to leave only the cells with text in them, in other words the names of the employees. It should give the value 9 and look like this.

A	
Number of workers who have not finished	
=COUNT(A2:A19)	
Number of workers on the project	
=COUNTA(A2:A19)-COUNT(A2:A19)	

	A
1	Project 142
2	Laila Aboli
3	4
4	Sri Paryanti
5	7
6	David Watson
7	2
8	Graham Brown
9	12
10	John Reeves
11	
12	Brian Sargent
13	6
14	Dan Bray
15	
16	Thirumalar Asokmani
17	3
18	Lea Cabusbusan
19	2
20	
21	Number of workers who have not finished
22	7
23	Number of workers on the project
24	9

### Activity 14c

Open the file CLASSLIST.CSV. This spreadsheet lists all the students in a class. If a student has attended any clubs during the year, the number of times they have attended is recorded in the cell below their name. Place a formula in cell A71 to count the number of students in the class. Place a formula in cell A74 to count the number of students who have attended extra clubs this year.

## COUNTIF

### Task 14h

Open the file STAFF.CSV. This file lists some workers on another project and lists each worker's job.

Place formulae in cells B24 to B28 to count how many of each type of worker are employed on the project.

Place a formula that uses both absolute referencing in cell B31 to count the number of employees with less than five years' experience.

Place a formula that uses both absolute referencing in cell B32 to count the number of employees with ten or more years' experience.

For this task, you need to count how many people have each type of job. Open the file and place the cursor in cell B24. The function needed for this task is **COUNTIF**, which looks at the cells within a given range and counts the number of cells in that range that meet a given condition. The condition is placed in the function and can be a number, a string, an inequality or a cell reference. There are a number of ways the **COUNTIF** function can be used: any of the formulae given in Table 14.4 can be entered in cell B24 and will give the correct result.

Replicate this formula into cells B25 to B28. As these cells are to be replicated, methods three and four in Table 14.4 are the most efficient, as you do not have to edit each formula with a different name for each row. If an examination question asks you to show evidence of absolute and relative referencing, then method three would be the most appropriate. If named ranges are required or absolute and relative referencing are not asked for in the question method four is the most efficient.

### Hint

Note in examples one and three in Table 14.4 that the range **\$B\$3:\$B\$21** has been set as an absolute reference so that this range is always in the same place if the formula is replicated. Also note that examples three and four have cell A24 set as a relative reference so that it will look for the next job title when the formula is replicated. Named ranges are absolute references, but you must show screenshot evidence that you have named the range correctly in the practical examinations.

Function	What it does?
<b>=COUNTIF(\$B\$3:\$B\$21,"Director")</b>	Counts the number of cells in the range B3 to B21 that contain the word 'Director'
<b>=COUNTIF(Job,"Director")</b>	Counts the number of cells in the named range Job (B3 to B21) that contain the word 'Director'. This only works if cells B3 to B21 have been named 'Job'
<b>=COUNTIF(\$B\$3:\$B\$21,A24)</b>	Counts the number of cells in the range B3 to B21 that contain the same text as the contents of cell A24
<b>=COUNTIF(Job,A24)</b>	Counts the number of cells in the named range Job (B3 to B21) that contain the same text as the contents of cell A24. This only works if cells B3 to B21 have been named 'Job'

**Table 14.4** Alternative formulae using the **COUNTIF** function

To count the number of employees with less than five years' experience, place the cursor in cell B31 and enter the formula **=COUNTIF(\$C\$3:\$C\$21,"<5")**. This will look at the range C3 to C21 and count the cells with a number value of less than five. The speech marks around the <5 are needed to tell *Excel* that it is dealing with another formula (in this case an inequality), rather than searching for the symbols <5. The spreadsheet should show the value 8.

To count the number of employees with ten or more years' experience, place the cursor in cell B32 and enter the formula **=COUNTIF(\$C\$3:\$C\$21,">=10")**. The value calculated should be 5. Save your spreadsheet as Ch\_14\_Task\_14h.

**Activity 14d**

Open the file that you saved in Activity 14c. This spreadsheet lists all the students in a class. Next to each student's name is the colour of the house that they are in.

Place formulae in cells E2 to E5 that use both absolute and relative referencing and count the number of students in each house.

Place a formula that uses in cell E7 to count the number of students with less than five clubs.

Place a formula that uses in cell E8 to count the number of students with 12 or more clubs.

**IF**

An **IF** function contains a pair of brackets and within the brackets three parts, each separated by a comma. An example of an IF function is **=IF(A1=5,A2\*0.05,"No discount")**. The first part is a condition; in this example, it is testing to see if cell A1 contains the number 5. The other two parts are what to do if the condition is met, and what to do if it is not met. If the condition is met a number or label could be placed in the cell, or a reference to another cell, or even a calculation that needs to be performed. The same range of options applies if a condition is not met. In this example, if the condition is met, the result of multiplying the contents of cell A2 by the figure 0.05 is displayed in this cell. If the condition is not met this cell will display the text 'No discount'.

**Task 14i**

Open the file that you saved in Task 14h. Add a new label 'Category' into cell D2.

Place formulae in cells D3 to D21 to display 'Very experienced' for employees with ten or more years' experience and otherwise to display 'Not experienced'.

Open the file and place the cursor in cell D2. Enter the label 'Category'. Place the cursor in cell D3 and enter the formula: **=IF(C3>=10,"Very experienced","Not experienced")**. The reason that **C3>=10** is used rather than **C3>9** (which in many circumstances would be a more efficient formula), is because one employee has 0.2 years' experience. As the data does not all contain whole numbers, there could be an employee with 9.5 years experience so this would not work for all data. Do not use absolute referencing in this formula as the reference to cell C3 needs to change when you replicate the formula. Replicate this formula so it is copied into cells D4 to D21. Your spreadsheet should look similar to this.

Save your spreadsheet as Ch\_14\_Task\_14h.

	A	B	C	D
1	<b>Project 153</b>			
2	<b>Name</b>	<b>Job</b>	<b>Years exp</b>	<b>Category</b>
3	Laila Aboli	Programmer	3	Not experienced
4	Greg Mina	Programmer	2	Not experienced
5	Sri Paryanti	Analyst	12	Very experienced
6	Bishen Patel	Sales	5	Not experienced
7	Rupinder Singh	Engineer	7	Not experienced
8	Sergio Gonzalez	Programmer	5	Not experienced
9	Rupinder Vas	Sales	6	Not experienced
10	Henri Ramos	Sales	10	Very experienced
11	John Mortlock	Programmer	14	Very experienced
12	Cameron Garnham	Analyst	7	Not experienced
13	Brian Guthrie	Director	3	Not experienced
14	Julia Frobisher	Engineer	6	Not experienced
15	Dan McNevin	Programmer	9	Not experienced
16	Patrick O'Malley	Engineer	11	Very experienced
17	Thirumalar Asokmani	Sales	10	Very experienced
18	Sean O'Byrne	Programmer	2	Not experienced
19	Lea Cabusbusan	Programmer	1	Not experienced
20	Brian O'Driscoll	Programmer	0.2	Not experienced
21	Wim Van Hoffmann	Engineer	2	Not experienced

**Activity 14e**

Open the file that you saved in Activity 14d.

Add a new label 'New students' into cell F1.

Place formulae in cells F2 to F6 to display 'Add to this house' if the number of students in the house is fewer than six or to display 'Full' if the number is six or more.



## Nested formulae and functions

A nested formula or function is having one formula or function inside another one. Sometimes nested formulae could contain several formulae nested within each other. If the nested functions include a number of IF statements, be careful to work in a logical order, either from smallest to largest or vice versa (depending upon the question). Do *not* start with middle values, this will give incorrect results.

### Hint

Note that as the conditions are all 'greater than', they have been placed in reverse order. For example, if the value for experience was 40 and the condition <5 was first, then >=5 next and then >=10: the first condition <5 would be not true, so it would go to the next condition; >=5 would be true, so the result displayed would be 'Experienced'; it would never get as far as the test for >=10.

### Task 14j

Open the file that you saved in Task 14i.

Change the formulae in cells D3 to D21 to display 'Not experienced' if they have less than five years' experience, 'Experienced' if they have five or more years' experience and 'Very experienced' for employees with ten or more years' experience.

For this task, three conditions exist. If the value for experience is:

- >=10 then display 'Very experienced'
- >=5 then display 'Experienced'
- <5 then display 'Not experienced'.

Place the cursor into cell D3 and change the formula so that it becomes:  
`=IF(C3>=10,"Very experienced", IF(C3>=5,"Experienced","Not experienced"))`

Notice how the second formula (highlighted in yellow) has been placed as a 'No' condition within the first formula. Be very careful to get the brackets correct, each condition has one open and one close bracket. When you work through this formula, it checks whether the value is greater than or equal to ten first; if so, it displays the correct text. Then if it was not true it would check if the value is greater than or equal to five next, if so it displays the correct text. As there are no other conditions that could occur, rather than having another nested statement the resulting text has been placed.

Replicate this formula into cells D4 to D21. Your spreadsheet should look similar to this. Save your spreadsheet as Ch\_14\_Task\_14j.

### Activity 14f

Open the file that you saved in Activity 14e.

Change the formulae in cells F2 to F6 to display 'Add to this house' if the number of students in this house is fewer than six, 'Ideal number' if there are between six and ten students and 'Full' if the number is more than ten.

	A	B	C	D
1	Project 153			
2	Name	Job	Years exp	Category
3	Laila Aboli	Programmer	3	Not experienced
4	Greg Mina	Programmer	2	Not experienced
5	Sri Paryanti	Analyst	12	Very experienced
6	Bishen Patel	Sales	5	Experienced
7	Rupinder Singh	Engineer	7	Experienced
8	Sergio Gonzalez	Programmer	5	Experienced
9	Rupinder Vas	Sales	6	Experienced
10	Henri Ramos	Sales	10	Very experienced
11	John Mortlock	Programmer	14	Very experienced
12	Cameron Garnham	Analyst	7	Experienced
13	Brian Guthrie	Director	3	Not experienced
14	Julia Frobisher	Engineer	6	Experienced
15	Dan McNevin	Programmer	9	Experienced
16	Patrick O'Malley	Engineer	11	Very experienced
17	Thirumalar Asokmani	Sales	10	Very experienced
18	Sean O'Byrne	Programmer	2	Not experienced
19	Lea Cabusbusan	Programmer	1	Not experienced
20	Brian O'Driscoll	Programmer	0.2	Not experienced
21	Wim Van Hoffmann	Engineer	2	Not experienced

## SUMIF

### Task 14k

Open the file that you saved in Task 14j.

Insert the label 'Total experience for:' in cell A34, the label 'Programmer' in cell A35 and 'Engineer' in cell A36.

Insert a formula in cell B35 that uses both absolute and relative referencing to calculate the number of years' experience for the programmers.

Insert a formula in cell B36 that uses both absolute and relative referencing to calculate the number of years' experience for the engineers.

### Hint

You could use named ranges rather than absolute referencing for cells B3 to B21 and C3 to C21. One alternative formula in cell B35 which uses the named range 'Job' created earlier in the chapter is `=SUMIF(Job,A35,$C$3:$C$21)`.

**SUMIF** works in a similar way to **COUNTIF**. It compares each value in a range of cells and if the value matches the given condition it adds another related cell to form a running total.

Add the labels as required by the task into cells A34, A35 and A36. Move the cursor into cell B35 and enter the formula `=SUMIF($B$3:$B$21,A35,$C$3:$C$21)`. The total for this cell starts at zero. This looks at the contents of each row in the range B3 to B21 and compares the value in each cell to the contents of cell A35 (which contains the text 'Programmer'). If these two items are identical it adds the value from the same row within the range C3 to C21 to the total. When all rows in this range have been checked the total is displayed in this cell. This happens within a fraction of a second as you press the <Enter> key or change any value within these ranges.

To total the hours for the engineers, place in cell B36 the formula `=SUMIF($B$3:$B$21,A36,$C$3:$C$21)`. The results of these formulae should look like this. Save the spreadsheet as Ch\_14\_Task\_14k.

	A	B
34	Total experience for:	
35	Programmer	36.2
36	Engineer	26
37		

### Activity 14g

Open the file CLUBS.CSV.

Insert a formula in cell B37 that uses both absolute and relative referencing to calculate the number of clubs attended by students in red house.

Replicate this formula in cells B38 to B40 for the other coloured houses.

## Using lookups

The term 'look up', as used in the practical examinations, means to look up from a list. It does not mean that you should use the **LOOKUP** function, as there are three variations of the **LOOKUP** function that can be used within *Excel*. These are: **LOOKUP**, **HLOOKUP** and **VLOOKUP**.

### LOOKUP

**LOOKUP** is used to look up information using data in the first row or the first column of a range of cells and returns a relative value. For the purpose of the practical examinations, this is probably the least useful of the three formulae.

## HLOOKUP

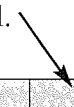
HLOOKUP is a function that performs a horizontal look-up of data. This should be used when the values that you wish to compare your data with are stored in a single row. The values to be looked up are stored in the rows below these cells.

### Task 14l

Open the file JOBS.CSV.

Insert formulae in the Description column to look up and display the JobTitle using the JobCode as the look-up value.

Open the file JOBS.CSV and click the left mouse button to place the cursor in cell C6. Enter the formula **=HLOOKUP(B6,\$B\$2:\$H\$3,2)** into this cell. This formula will look up and compare the contents of cell B6 with the contents of each cell in the top (horizontal) row of the range B2 to H3. When it finds a match, it will take the value or label stored in the second row which is directly under the matched cell. The two at the end of the formula tells *Excel* to look in the second row of the given range. Replicate this formula into cells C7 to C27. The results should look similar to this. Save the spreadsheet as Ch\_14\_Task\_14l.



	A	B	C	D	E	F	G	H
1	Project 160							
2	JobCode	1	2	3	4	5	6	7
3	JobTitle	Director	Engineer	Analyst	Sales	Programmer	Tester	Clerical
4								
5	Name	JobCode	Description					
6	Laila Aboli	5	Programmer					
7	Greg Mina	5	Programmer					
8	Sri Paryanti	3	Analyst					
9	Bishen Patel	4	Sales					
10	Rupinder Singh	2	Engineer					
11	Sergio Gonzalez	5	Programmer					

### Hint

Experiment with these settings. Change the value in cell B24 to 5.2 See the result of this change. Now change the exact match condition from False to True in cell C24. See the result of this change. Try other numbers like 5.9 in B24 to see what happens

## VLOOKUP

VLOOKUP is a function that performs a vertical look-up of data. This should be used when the values that you wish to compare your data with are stored in a single column. The values to be looked up are stored in the columns to the right of these cells. The look-up data can be stored either in the same file or in a different file.

### Task 14m

Open the file TASKS.CSV.

Insert formulae in the CurrentTask column to look up the client, using the TaskCode for the look-up value and the file CLIENT.CSV. Make sure that you use both absolute and relative referencing within your function.

Open the file TASKS.CSV and click the left mouse button to place the cursor in cell C3. The Task instructs you to use the file CLIENT.CSV for the lookup. Examine this file by opening it in a new spreadsheet. Look at the layout of this file to decide which type of look up formula to use. CLIENT.CSV looks like this.

	A	B
1	TaskCode	Client
2	1	Rootrainer
3	2	Quattichem
4	3	Hothouse Design
5	4	Avricom
6	5	Binnaccount
7	6	LGY
8	7	Rock ICT

Because it is stored with the look up data in vertical columns, a VLOOKUP is the most appropriate formula to use. Enter the formula `=VLOOKUP(B3, Client.csv!$A$2:$B$8,2,FALSE)` into this cell. This formula will look up and compare the contents of cell B3 with the contents of each cell in the left (vertical) column of the range A2 to B8 within the file CLIENT.CSV. When entering this formula, you can add the yellow highlighted section of the formula by moving the cursor into this file and dragging it to highlight all of the cells in both columns, so it includes the look-up value and the result. The number 2 in the formula tells *Excel* to look in the second column of this range. The 'False' condition in the formula tells *Excel* to only display the match if it is an exact match. If you set this to True it will find the nearest approximate match. When it finds a match, it will take the value or label stored in the second column which is to the right of the matched cell. Replicate this formula into cells C4 to C24.

	A	B	C
1	Current client list		
2	Name	TaskCode	CurrentTask
3	Laila Aboli	6	LGY
4	Greg Mina	4	Avricom
5	Sri Paryanti	6	LGY
6	Bishen Patel	6	LGY
7	Rupinder Singh	3	Hothouse Design
8	Sergio Gonzalez	5	Binnaccount
9	Rupinder Vas	1	Rootrainer
10	Bryan Revell	1	Rootrainer
11	Henri Ramos	7	Rock ICT

The results should look similar to this. Save the spreadsheet as Ch\_14\_Task\_14m.

### Activity 14h

Open the file TUTORS.CSV. This lists a number of students and the initials for their personal tutor.

Insert formulae in the Tutor Name column to look up the tutor's name using the file TEACHERS.CSV. Insert formulae in the Room Number column to look up the room number using the file ROOMS.CSV. Make sure that you use both absolute and relative referencing within all of your functions. Save your spreadsheet.

## 14.3 Testing the data model

Designing a test plan and choosing your test data are the most important parts of testing the data model. Choose data that will test every part of a condition. Be careful to test each part of the spreadsheet with **normal** data that you would expect to work with your formulae, with **extreme** data to test the boundaries and with **abnormal** data that you would not expect to be accepted. Carefully check that each formula and function works as you expect it to by using simple test data.

For example, to test the look-up used in Task 14m:

- make sure that each number between 1 and 7 (normal data) is used in the TaskCode
- use 0 and 8 and other abnormal data
- use decimal values between 1 and 7.

Write down each number and the expected results, before trying each number in the TaskCode column. Check that the actual result matches the expected result for every entry. If not, change the formula before starting the whole test process again. A test plan for this formula would be similar to that shown in Table 14.5.

Formula in cell C3 using data from cell B3:

Data entry in B3	Data type	Expected result	Actual result
1	Extreme/Normal	Rootrainer	
2	Normal	Quattichem	
3	Normal	Hothouse Design	
4	Normal	Avricom	
5	Normal	Binnaccount	
6	Normal	LGY	
7	Extreme/Normal	Rock ICT	
0	Abnormal	Error – value not available	
8	Abnormal	Error – value not available	
1.3	Abnormal	Error – value not available	
5.6	Abnormal	Error – value not available	
7.2	Abnormal	Error – value not available	
94	Abnormal	Error – value not available	

Table 14.5 Sample test plan for Task 14m

Many marks are lost in practical examinations by careless use of ranges within formulae and functions. Check that everything works before using real data in your model.

## 14.4 Selecting subsets of data

This means getting *Excel* to search through data held in a spreadsheet to extract only rows where the data matches your search criteria.

### Searching using text filters

#### Task 14n

Open the file that you saved in Task 14m.

Select from all the data only the employees who are currently working on jobs for Binnaccount.

Open the file that you saved in Task 14m and highlight cells A2 to C24. Select the **Data** tab and find the **Sort & Filter** section. Click on the **Filter** icon to display an arrow in the top right corner of each column, like this.



For this task, you need to use this arrow to select the people working on the Binnaccount task. When you click on the CurrentTask arrow, a small drop-down menu appears like this.

	A	B	C
1	Current client list		
2	Name	TaskCode	CurrentTask
3	Laila Aboli	6	LGY
4	Greg Mina	4	Avricom
5	Sri Paryanti	6	LGY
6	Bishen Patel	6	LGY
7	Rupinder Singh	3	Hothouse Design
8	Sergio Gonzalez	5	Binnaccount
9	Rupinder Vas	1	Rootrainer
10	Bryan Revell	1	Rootrainer
11	Henri Ramos	7	Rock ICT
12	John Mortlock	2	Quattichem
13	Cameron Garnham	2	Quattichem
14	Brian Guthrie	1	Rootrainer
15	Julia Frobisher	5	Binnaccount
16	Dan McNevin	1	Rootrainer
17	Shelash O'Leary	1	Rootrainer
18	Patrick O'Malley	5	Binnaccount
19	Thirumalar Asokmani	5	Binnaccount
20	Sean O'Byrne	3	Hothouse Design
21	Brett Ling	2	Quattichem
22	Lea Cabusbusan	7	Rock ICT
23	Brian O'Driscoll	3	Hothouse Design
24	Wim Van Hoffmann	5	Binnaccount

	A	B	C
1	Current client list		
2	Name	TaskCode	CurrentTask
3	Laila Aboli		
4	Greg Mina		
5	Sri Paryanti		
6	Bishen Patel		
7	Rupinder Singh		
8	Sergio Gonzalez		
9	Rupinder Vas		
10	Bryan Revell		
11	Henri Ramos		
12	John Mortlock		
13	Cameron Garnham		
14	Brian Guthrie		
15	Julia Frobisher		
16	Dan McNevin		
17	Shelash O'Leary		
18	Patrick O'Malley		
19	Thirumalar Asokmani		
20	Sean O'Byrne		

	A	B	C
1	Current client list		
2	Name	TaskCode	CurrentTask
8	Sergio Gonzalez	5	Binnaccount
15	Julia Frobisher	5	Binnaccount
18	Patrick O'Malley	5	Binnaccount
19	Thirumalar Asokmani	5	Binnaccount
24	Wim Van Hoffmann	5	Binnaccount

### Hint

To remove the AutoFilter, either click on the tick box for (Select All), or use select Clear Filter in the drop-down list.

In the **Text Filters** section of the menu, click on the tick box for (Select All) to remove all of the ticks from every box. Then tick only the Binnaccount box, before clicking on **OK**. This will display only the five selected rows like this.

The same method can be used to select more than one company from the list. By selecting different drop-down menu options, searches can be made using different criteria in different columns. Save the spreadsheet as Ch\_14\_Task\_14n.

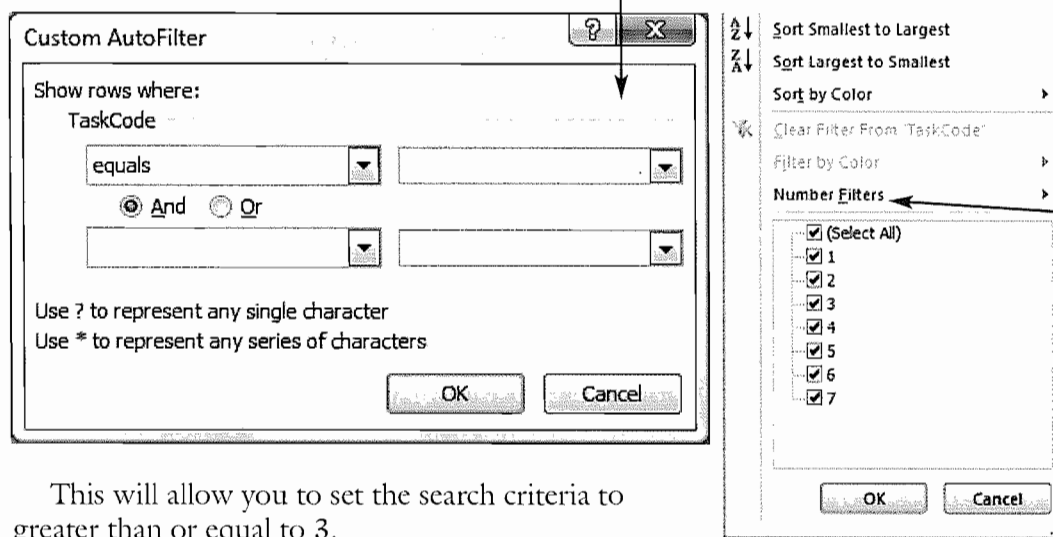
## Searching using number filters

### Task 14o

Open the file that you saved in Task 14m.

Select from all the data only the employees where the task code is between three and six inclusive.

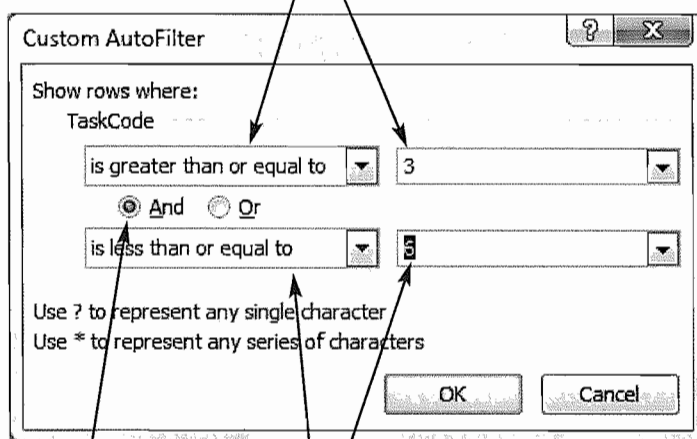
Open the file and set the **AutoFilter** arrows for cells A2 to C24 as in the previous task. This time the search will be performed on the TaskCode column. Select the drop-down menu for this column using the arrow. Select **Number Filters** to get a sub-menu. Select **Custom Filter...** to get the **Custom AutoFilter** window.



### Hint

The method shown here is an alternative to selecting only the boxes for three, four, five and six. Even though it may seem easier to click on the tick boxes for this question, you will need to use the Custom AutoFilter window where a number of options are required. The Custom AutoFilter window also allows you to select is not equal to and to perform wildcard searches.

This will allow you to set the search criteria to greater than or equal to 3.



AND

less than or equal to 6.

The drop-down options in each box of the **Custom AutoFilter** window can be used to select equals to, not equal to, less than, or greater than, as well as the options shown. Save the spreadsheet as Ch\_14\_Task\_14o.

## Searching using more than one criteria

### Task 14p

Open the file that you saved in Task 14m.

Select from all the data all the employees except John Mortlock and Sean O'Byrne who are currently working on jobs for Quattichem or Hothouse Design.

Open the file and set the **AutoFilter** arrows for cells A2 to C24 as in the previous task. This time the search will be performed on both the Name and CurrentTask columns. Select the drop-down arrow for the Name column, **Text Filters** and then select **Does Not Equal** from the sub-menu. This opens the **Custom AutoFilter** window, enter the initial letter 'J' in the right box (this speeds up the search). When you click on the arrow for the drop-down list it will show you all the Names starting with 'J', so select 'John Mortlock' from the list. Select the AND operator and repeat the process for Sean O'Byrne, selecting **does not equal** in the left box and typing 'S' to find Sean O'Byrne, selecting his name from the list in the right box. Click on **OK**.

Select the search arrow for the CurrentTask column. Select from this menu only the two tick boxes for 'Hothouse Design' and 'Quattichem', or select **Text Filters** and set up the OR search like this.

Save the spreadsheet as Ch\_14\_Task\_14p. The results of this task should look like this.

	A	B	C
1	Current client list		
2	Name	TaskCod	CurrentTask
7	Rupinder Singh		3 Hothouse Design
13	Cameron Garnham		2 Quattichem
21	Brett Ling		2 Quattichem
23	Brian O'Driscoll		3 Hothouse Design

### Activity 14i

Open the file that you saved in Task 14h. Select from all the data:

- all the students with a tutor called Chris Scott
- all the students who will be using rooms numbered between 22 and 74 inclusive
- all the students except Kiah and Hartati with a tutor called Kate Morrissey or Mike Arnott.

## Searching using wildcards

A wildcard is a character that is used as a substitute for other characters. The \* (asterisk) character is often used to show a number of characters (including 0) and the ? (question mark) is often used to show a single character. *Excel* uses these wildcard characters, but AutoFilter also contains other features that simplify some of these searches.

### Task 14q

Open the file that you saved in Task 14m.

Select from all the data only the employees who have a name that starts with the letter 'S'.



**Hint**

The method shown here is an alternative to selecting Text Filters, then Equals and entering S\* before clicking on **OK**.

Open the file and set the AutoFilter arrows for the cells A2 to C24 as in the previous task. This time the search will be performed on the Name column. Click on the drop-down arrow for this column and select **Text Filters** followed by **Begins With...** from the sub-menu. This opens the **Custom AutoFilter** window. Enter the initial S in the right box like this and click on **OK**. You should find these four rows. Save the spreadsheet as Ch\_14\_Task\_14q.

Custom AutoFilter

Show rows where:

Name

begins with S

☒ And ☐ Or

Use ? to represent any single character  
Use \* to represent any series of characters

OK Cancel

	A	B	C
1	Current client list		
2	Name	<input checked="" type="checkbox"/> TaskCod	<input type="checkbox"/> CurrentTask
5	Sri Paryanti		6 LGY
8	Sergio Gonzalez		5 Binnaccount
17	Shelash O'Leary		1 Roottrainer
20	Sean O'Byrne		3 Hothouse Design

**Task 14r**

Open the file that you saved in Task 14m.  
Select from all the data only the employees who have a name that ends with the letter 'a'.

**Hint**

The method shown here is an alternative to selecting Text Filters, then the **Ends With...** option to obtain the **Custom AutoFilter** window. Enter the letter a in the right box like this and click on **OK**. You should find this single row. Save the spreadsheet as Ch\_14\_Task\_14r.

This is a similar process to the previous task. Use the same process, this time selecting the **Text Filters** from the menu, then the **Ends With...** option to obtain the **Custom AutoFilter** window. Enter the letter a in the right box like this and click on **OK**. You should find this single row. Save the spreadsheet as Ch\_14\_Task\_14r.

Custom AutoFilter

Show rows where:

Name

ends with a

☒ And ☐ Or

Use ? to represent any single character  
Use \* to represent any series of characters

OK Cancel

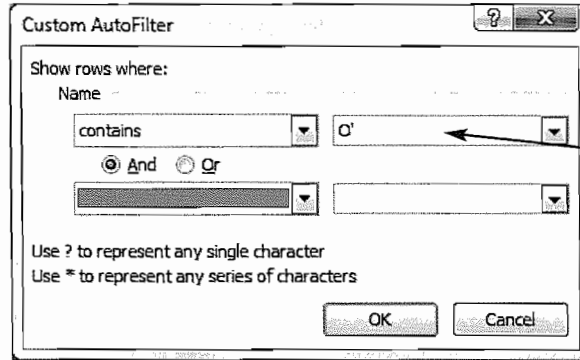
	A	B	C
1	Current client list		
2	Name	<input checked="" type="checkbox"/> TaskCod	<input type="checkbox"/> CurrentTask
4	Greg Mina		4 Avricom

**Task 14s**

Open the file that you saved in Task 14m.  
Select from all the data only the employees who have a name that contains the characters 'O'.

### Hint

The method shown here is an alternative to selecting Text Filters, then Equals and entering \*O'\* before clicking on **OK**.



Again, select the **Text Filters** from the drop-down menu in the Name column. This time select the **Contains...** option, enter the letter **O** followed by an apostrophe to the right box and click on **OK**. You should find these four rows. Save the spreadsheet as **Ch\_14\_Task\_14s**.

	A	B	C
1	Current client list		
2	Name	TaskCode	CurrentTask
17	Shelash O'Leary	1	Rootrainer
18	Patrick O'Malley	5	Binnaccount
20	Sean O'Byrne	3	Hothouse Design
23	Brian O'Driscoll	3	Hothouse Design

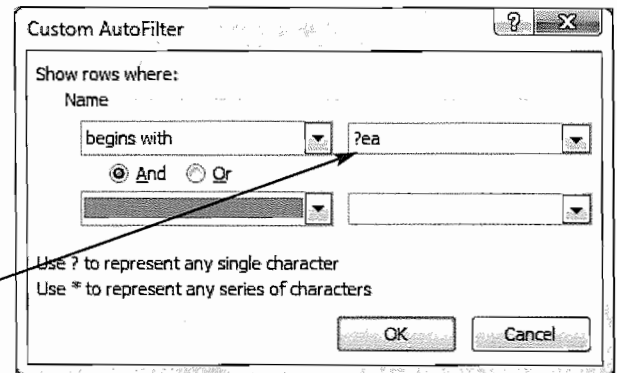
### Hint

The method shown here is an alternative to selecting Text Filters, then Equals and entering ?ea\* then **OK**.

### Task 14t

Open the file that you saved in Task 14m. Select from all the data only the employees who have a first name that has the second and third letters as 'ea'.

Using the same methods as the previous searches, select the **Text Filter** from the drop-down menu in the Name column. This time select the **Begins With...** option and add the characters ?ea to the right box before clicking on **OK**. This tells *Excel* that the first letter can contain any character. Then there must be the letters 'ea' followed by any other characters. You should find these two rows. Save the spreadsheet as **Ch\_14\_Task\_14t**.



	A	B	C
1	Current client list		
2	Name	TaskCode	CurrentTask
20	Sean O'Byrne	3	Hothouse Design
22	Lea Cabusbusan	7	Rock ICT

### Activity 14j

Open the file that you saved in Task 14h. Select from all the data:

- all the students with a forename that starts or ends with the letter 'R'
- all the students with a forename that contains the letters 'eth'
- all the students with a forename that contains the letters 'Jam' and who have a tutor who uses room 60.

## 14.5 Sorting data

Before you try to sort any data, make sure that you select all of the data for each item to be sorted. One common error in practical examinations is to select and sort on a single column. If you were to do this, the integrity of the data would be lost.

Table 4.6 gives an example showing correct and incorrect sorting on the student's name for a spreadsheet containing their test results in Maths and English. The yellow shaded cells show the areas selected for the sort. Note how the results for each person have been changed when sorting without highlighting all the data.

Original data			Sorted correctly with all data selected			Sorted with only the name column selected		
Name	Maths	English	Name	Maths	English	Name	Maths	English
Shelia	72	75	Karla	52	75	Karla	72	75
Marcos	64	34	Marcos	64	34	Marcos	64	34
Vikram	61	44	Shelia	72	75	Shelia	61	44
Karla	52	75	Vikram	61	44	Vikram	52	75

Table 4.6 Correct and incorrect data selection for sorting

### Task 14u

Open the file SALARY.CSV.

Sort the data into ascending order of surname, then ascending order of forename.

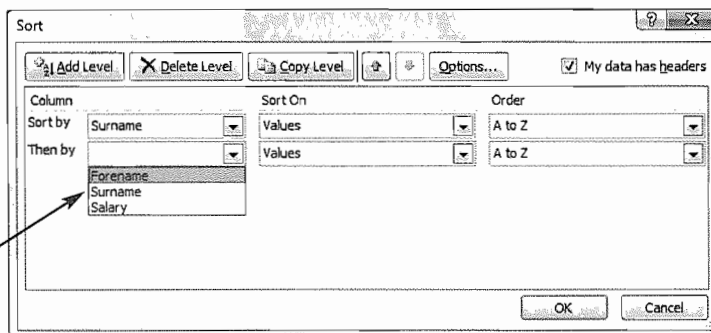
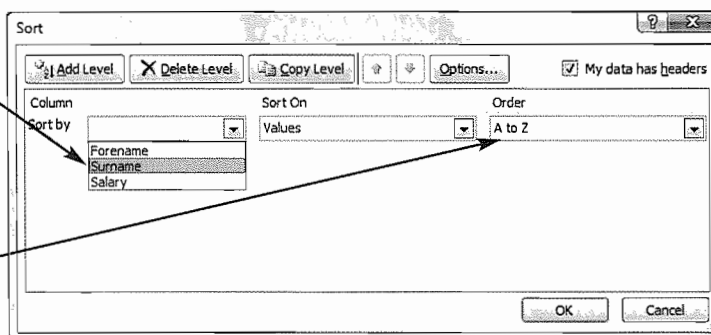
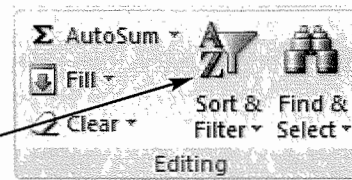
Open the file SALARY.CSV. Highlight all the cells in the range A2 to C43. Do not highlight row 1 or the column headings would also be sorted within the employee names. Select the **Home** tab and find the **Editing** section. Click on the **Sort & Filter** icon to obtain the drop-down menu. Select **Custom**

**Sort...** to open the **Sort** window. In the **Sort by** box select **Surname** from the drop-down list. This will be the primary sort for this task. Make sure that the **Order** box contains **A to Z** to sort the data into ascending order.

To add the secondary sort to this data you need to add a second level to the **Sort** window. Click on **Add Level** to add the second sort level. In the **Then by** box select **Forename** from the drop-down list. Again, make sure that the **Order** box contains **A to Z** to sort the data into ascending order. Click on **OK** to perform the sort.

### Hint

You can sort into descending order rather than ascending order by selecting **Z to A** rather than **A to Z** in the **Order** box.



The data should look like this.

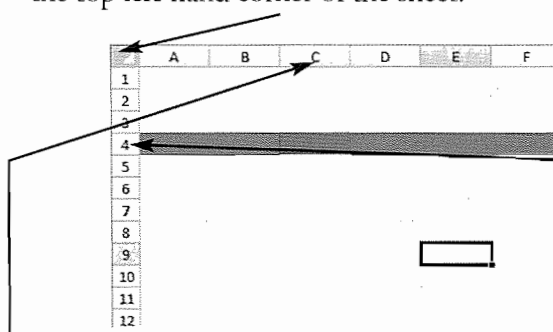
### Activity 14k

Open the file that you saved in Activity 14h. Sort the data into descending order of tutor name, then ascending order of forename.

	A	B	C
1	Forename	Surname	Salary
2	Laila	Aboli	25000
3	Thirumalar	Asokmani	10000
4	Lea	Cabusbusan	28000
5	Liam	Chi	8500
6	Dan	Dare	14000
7	Julia	Frobisher	16500
8	Cameron	Garnham	36000
9	Jake	Garnham	12500
10	Lauren	Garnham	6200
11	Jack	Gonzalez	8200
12	Sergio	Gonzalez	26000
13	Brian	Guthrie	43000
14	Lilik	Kaznica	9000
15	Jamal	Khan	8000
16	Kristy	King	12300
17	Brett	Ling	8200
18	Holly	Ling	27000

## 14.6 Using display features

Many of the features described in this section can be applied to an individual cell, a range of cells, to one or more rows or columns, or to the entire spreadsheet. To apply the feature to the entire spreadsheet, click in the top left-hand corner of the sheet.



To select a row or rows, click on the number or numbers to the left of the row and it will select all the cells in that row.

To select a column or columns, click on the column letter or letters to select all the cells in the column or columns. To select a single cell, click in that cell. To select a range of cells, drag the cursor to highlight a range of cells. If you need to select different cells or ranges from different parts of the sheet at the same time, hold down the <Ctrl> key whilst making your selections.

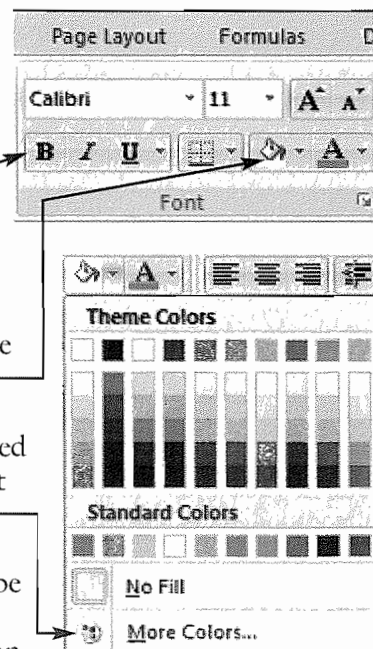
### Enhancing data

To enhance data, first select the data to be enhanced. All of the enhancement features are located using the **Home** tab. The **Font** section contains icons to allow you to set the cell contents to underlined, *italic* (sloping) or bold.

The font size of a cell can be changed by either typing a new size in the point size box or using the drop-down menu to select a suitable size.

Cells can also be enhanced using different colours for the background of the cell. Again, highlight the area to be coloured and select the drop-down menu from the **Fill Color** icon. The drop-down menu looks like this. There are a number of standard colours as well as colours selected by *Excel* for the current colour schemes. If the colour that you want is not there, click on the colour palette icon.

If you are selecting colours, ensure that the foreground and background colours contrast and can be easily seen when printed. The foreground colour of a cell (the font colour) can be selected in the **Font** section. The **Font Color** icon is to the right of the **Fill Color** icon. The drop-down menu from this icon is the same as the menu for the background colour.



### Activity 14l

Open the file that you saved in Activity 14g.

Set all the cells in rows 1 and 36 to bold and italic. Underline the cell containing your name. Set cells A1 to C1 to have white text on a black background. Set the background colour for each of the cells in the range A37 to A40 to match the colour of each house.

### Formatting cells

Formatting cells containing numbers changes the way a cell is displayed, but does not change the values held within it.

#### Task 14v

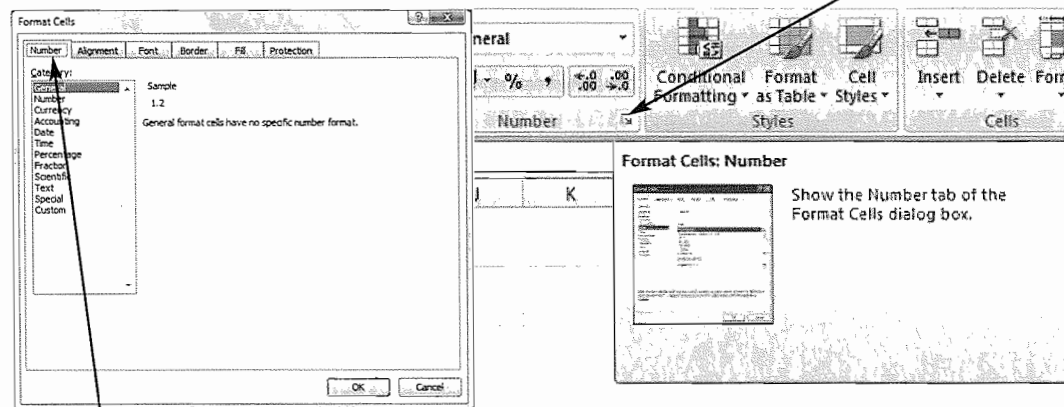
Create a spreadsheet model that looks like this. Place a formula in cell C2 that multiplies the contents of cell A2 by the contents of cell B2. Format cell A2 as an integer.

	A	B	C
1	First	Second	Product
2	1.2	5	

Create this spreadsheet as shown. In cell C2 enter the formula  $=A2*B2$ . The spreadsheet will look like this.

	A	B	C
1	First	Second	Product
2	1.2	5	6

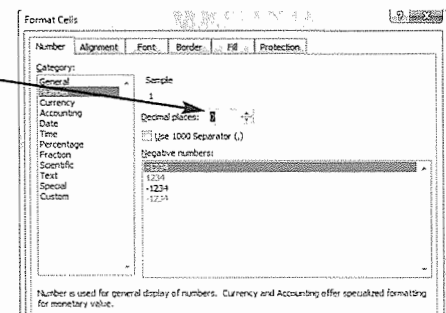
To format cell A2 as an integer, place the cursor in this cell and select the **Home** tab. In the **Number** section, click on the arrow in the bottom right corner to open the **Format Cells** window.



When this window opens, it should have the **Number** tab selected. The **Format Cells** window will allow you to format cells in different currencies, into percentages or even as dates or times.

For this task, you need to format this cell as a number. Select the **Number** option in the **Category:** section. Change the cell formatting to 0 **Decimal places**. Click on **OK** to set the formatting. The spreadsheet will now look like this.

	A	B	C
1	First	Second	Product
2	1	5	6



If you compare the two views of the spreadsheet, you can see that cell A2 has changed. The contents still remain 1.2 but in the second view the answer for the product appears to be incorrect. To change the contents of cell A2 to a whole number, use the INT function.

Original				Formatted			
	A	B	C		A	B	C
1	First	Second	Product	1	First	Second	Product
2	1.2	5	6	2	1	5	6

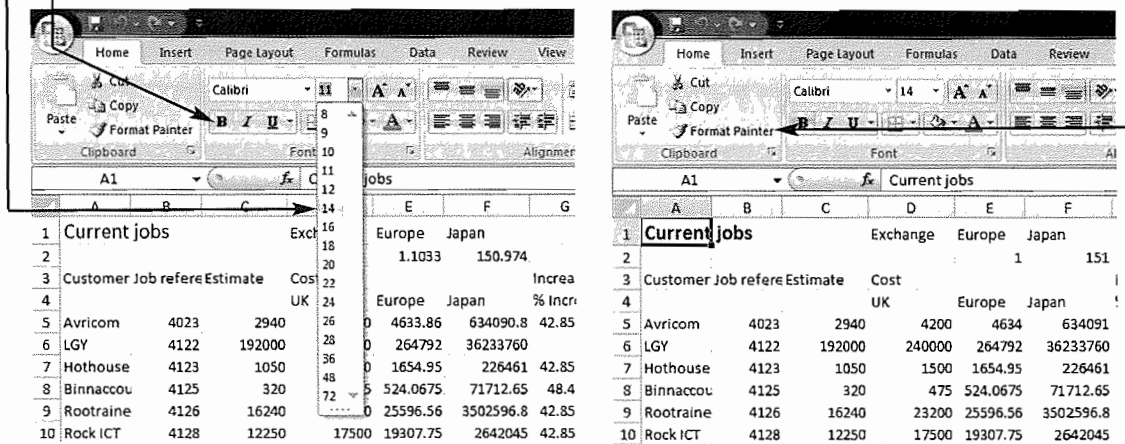
#### Task 14w

Open the file COSTS.CSV. Format cells A1, D1, D3 and G3 as a bold 14 point font. Format all numeric cells in row 2 into their respective currencies to 3 decimal places. Format all numeric cells in columns C and D into pounds sterling with 2 decimal places. Format the cells E5 to E15 into Euros with 2 decimal places. Format the cells F5 to F15 into Japanese Yen with 0 decimal places. Format all cells between G5 and G15 into percentage values with no decimal places.

Open the file COSTS.CSV. Click in cell A1. Select the **Home** tab, find the **Format** section, then use the drop-down list to change the size of this cell to 14 point.

Click the mouse on the **Bold** icon to set this cell to bold.

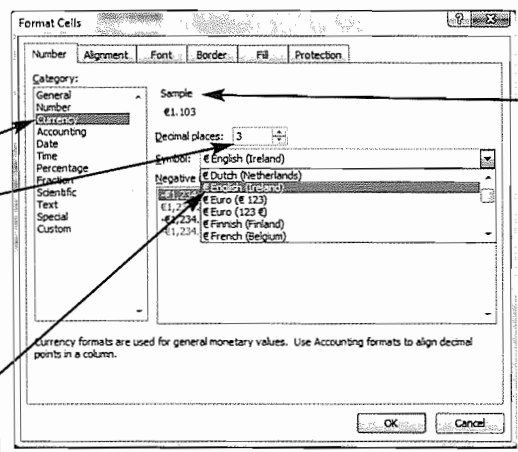
Click on the **Format Painter** icon and click in cell D1. Click on the **Format Painter** again and click in cell D3, then **Format Painter** again and cell G3. This process should copy the formatting from cell A1 into these other three cells.



Move the cursor into cell E2. In the **Number** section, click on the arrow in the bottom right corner to open the **Format Cells** window in the **Number** tab. In the **Category:** section, select **Currency**.

Set the number of decimal places to three. Although this is not the correct number of decimal places for Euros, it was specified in the task.

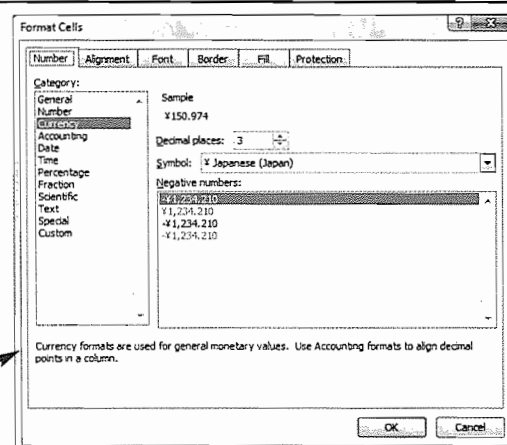
In the **Symbol:** section, select an appropriate Euro format from the list. You may need to scroll down the list of available currencies to find it. The **Sample** area will show you what the formatting of the cell will look like when you click on **OK**. When you have checked this formatting, click on **OK**.



### Hint

If the currency symbol that you are looking for (e.g. ¥) may not appear in the drop-down list, there are a number of text options available. In this case you can select JPY which is the international standard code for Japanese Yen.

Repeat this process for cell F2, but this time selecting Japanese Yen. Some currencies like Japanese Yen have no decimal places and so would normally need to be formatted to zero decimal places, but in this task you were told to set this cell to 3 decimal places. The **Format Cells** window should look like this. Click on **OK**.



To format all the numeric cells in columns C and D, highlight all cells in the range C5 to D15. Then open the **Format Cells** window and set the **Category:** to **Currency**, the number of **Decimal places:** to two and the **Symbol:** to pounds sterling (£). Repeat this process for cells E5 to E15, selecting Euros with 2 decimal places, and for cells F5 to F15 with Japanese Yen set to no decimal places (which are the appropriate formats for both of these currencies).

To format all cells between G5 and G15 into percentage values, highlight this range, then in the **Format Cells** window set the **Category:** to **Percentage**. Set the number of **Decimal places:** to 0. Resize columns as necessary. The finished spreadsheet should look like this.

	A	B	C	D	E	F	G
1	<b>Current jobs</b>		<b>Exchange</b>				
2					Europe	Japan	
3	Customer	Job reference	Estimate	Cost	€1.103	¥150.974	
4				UK	Europe	Japan	Increase
5	Avricom	4023	£2,940.00	£4,200.00	€4,634	¥634,091	43%
6	LGY	4122	£192,000.00	£240,000.00	€264,792	¥36,233,760	25%
7	Hothouse Design	4123	£1,050.00	£1,500.00	€1,655	¥226,461	43%
8	Binnaccount	4125	£320.00	£475.00	€524	¥71,713	48%
9	Rootrainer	4126	£16,240.00	£23,200.00	€25,597	¥3,502,597	43%
10	Rock ICT	4128	£12,250.00	£17,500.00	€19,308	¥2,642,045	43%
11	Quattichem	4129	£1,400.00	£2,000.00	€2,207	¥301,948	43%
12	LGY	4130	£10,800.00	£12,000.00	€13,240	¥1,811,688	11%
13	Hothouse Design	4131	£720.00	£720.00	€794	¥108,701	0%
14	Binnaccount	4132	£1,680.00	£2,400.00	€2,648	¥362,338	43%
15	Hothouse Design	4133	£4,500.00	£5,000.00	€5,517	¥754,870	11%

### Hint

An alternative to this for percentage values with no decimal places is to highlight the cell/s, select the **Home** tab and click the **Percent Style** icon in the **Number** section.

### Activity 14m

Open the file that you saved in Activity 14g.

In cell A41, place the label 'Total'.

In cell B41, add the total number of students in all houses.

In cell C36, add the label 'Percent'.

In cells C37 to C40, calculate, using absolute and relative referencing, the percentage of students in each house. Format these cells as a percentage with 1 decimal place.

### Activity 14n

Open the file ITEMS.CSV.

Format cells A4 and A5 so that they are bold, italic and 20 points high.

In cells C3 to F3, place current exchange rates for each currency shown. Use the internet (or exchange rates supplied by your teacher) to do this. Do not format these cells as currency.

For each cell in the range C8 to F22, calculate the price of each item in the correct currency.

Format each of the cells in the range B8 to F22 in the appropriate currency with the appropriate number of decimal places.

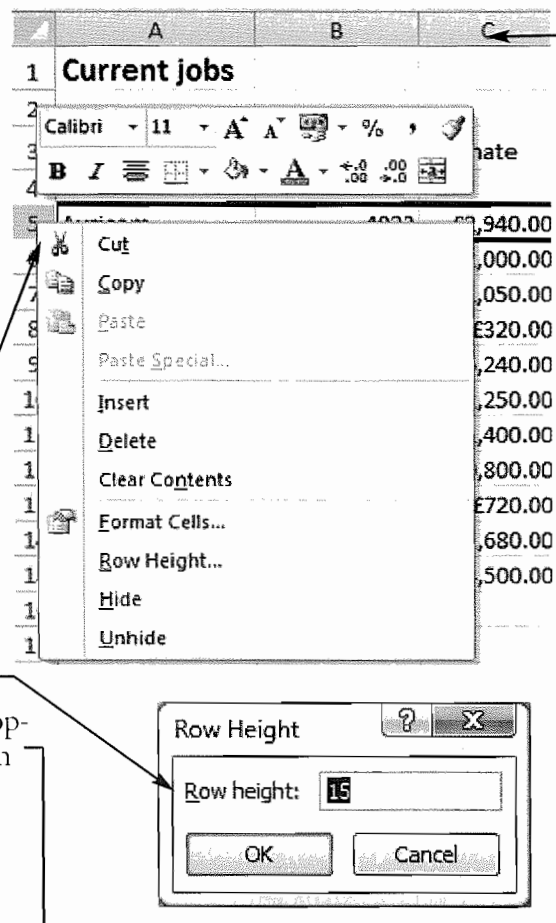
## Adjusting rows and columns

In Section 4.2, you learnt how to expand column widths using the drag handle to make sure that all data is visible in the spreadsheet. Row heights can be adjusted in exactly the same way.

The settings for row heights can also be changed by right clicking the mouse button on the row number on the left to obtain this drop-down menu.

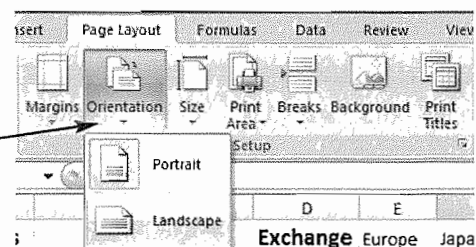
The row can be hidden from view by selecting the **Hide** option, or can have a different row height set using the **Row Height...** option. This option opens the **Row Height** window, where you can adjust the height setting before clicking on **OK**.

The column width can be hidden or adjusted in a similar way. To get the drop-down menu click the right mouse button on the column heading at the top of the column.



## Adjusting page orientation

You may need to change the page orientation from portrait to landscape, especially when displaying the formulae that you have used. To change this select the **Page Layout** tab, and find the **Page Setup** section. Click on the **Orientation** icon, then select either **Portrait** or **Landscape** from the drop-down menu.

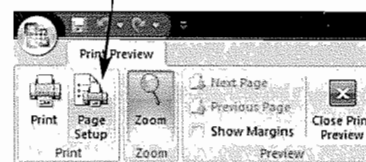




**Hint**

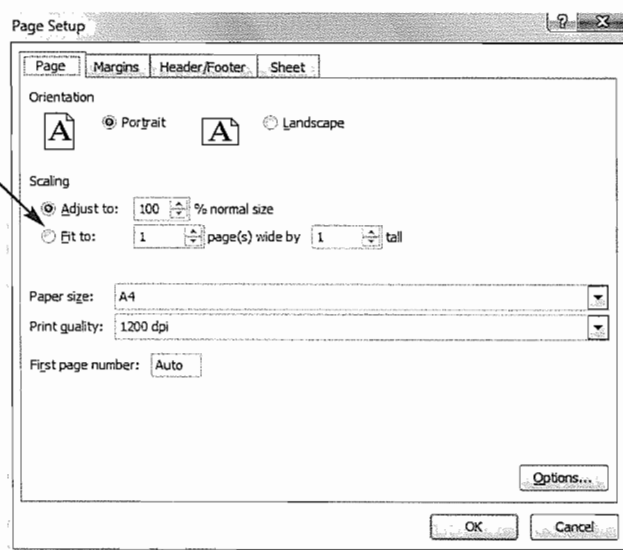
This window can be used as another way of changing the page orientation.

When preparing your spreadsheet for printing, you can adjust the layout of the spreadsheet on the printed page/s using **Print Preview**. To do this, select the **Office** button and then **Print** from the drop-down menu. Select the **Print Preview** option from the sub-menu. The print preview of the spreadsheet is shown. If you need to adjust how your spreadsheet appears, you can click on the **Page Setup** icon in the **Print Preview** tab to open the **Page Setup** window.



If you need to change the number of pages wide or tall in the printout use the **Fit to:** radio button in the **Scaling** section and select the number of pages.

Ensure that if you set a printout to a single page wide that all the formulae/ values and labels can be clearly seen. If the font size is so small that it is not clearly readable by an examiner, you may not be awarded the marks for that section. When you have changed the page settings click on **OK**.



## 14.7 Save and print data

Save your work regularly. As recommended in Section 13.1, it is a good idea to save different versions, both in your work and in the practical examinations, each with a different version number. If you make a mistake and corrupt a file, you can always go back and redo a small part of the task without losing too much time.

When printing your spreadsheets, make sure that you have adjusted all column widths and row heights to ensure that all printouts show all:

- labels in full
- formulae in full
- data in full.

Remember that the examiner can only mark what can be seen. If you don't show that you have done, it will not get you any marks. Many candidates forget to submit printouts showing the formulae used – check that you have worked through how to display formulae in Section 14.2. You can use screenshots to show how you achieved your results. Make sure that all printouts contain your name, candidate and centre number. To print, select the **Office** button followed by **Print**.

You may be required to export your spreadsheet data into different formats. In *Excel*, this is done by selecting the **Office** button followed by **Save As**. This will allow you to export the data into common text formats like .txt (text format), .rtf (rich text format) and .csv (comma separated values). Although other export features exist, these should be sufficient for the practical examinations.

## 14.8 Produce a graph or chart

In the examination, you may be asked to select an appropriate chart for a purpose. Which chart is the most appropriate is often very difficult to work out. For the practical examination, the choice will be between a pie chart, a bar chart and a line graph.

- **Pie charts:** if you are asked to compare percentage values, a pie chart is often the most appropriate type because pie charts *compare parts of a whole*. An example would be comparing the percentage of children who preferred ice cream, jelly or trifle.
- **Bar charts:** these *show the difference* between different things. A bar chart is traditionally a graph with vertical bars, but is called a column graph in *Excel*. This is a little confusing but in the practical examinations to create a vertical bar chart you would need to use the 'column chart' and for a horizontal bar chart (with the bars going across the page) you would need to use the 'bar chart'. An example would be showing the number of items sold by five people in the same month.
- **Line graphs:** these are used to *plot trends* between two variables. An example would be plotting the temperature of water as it was heated against time. You could then find any point in time on the graph and be able to read the corresponding temperature, even if the temperature had not been taken at that time.

### Hint

Do not use stacked column charts or stacked bar charts for the practical examinations

## Creating a chart

To create a chart, you have to highlight the data that you wish to use. This is highlighted in the same way as before. If all the data is together (**contiguous data**) this is easy. Sometimes in the practical examinations you will need to highlight data that is not kept together in the spreadsheet (**non-contiguous data**). To do this, hold down the <Ctrl> key whilst making your selections.

### Task 14x

Open the file EMPLOYEES.CSV. This shows the job types, the number of employees with that job type and the percentage of employees with that job type.

Create an appropriate graph or chart to show the number of employees with that job type.

Open the file and highlight only cells A1 to B8. The highlighted data should look like this. This highlighted area will be the cells used to produce the graph. Notice that the cells containing the column headings (A1 and B1) have been included in this selection as these will be used as the labels in the chart (they can be changed later if the question asks for different labels).

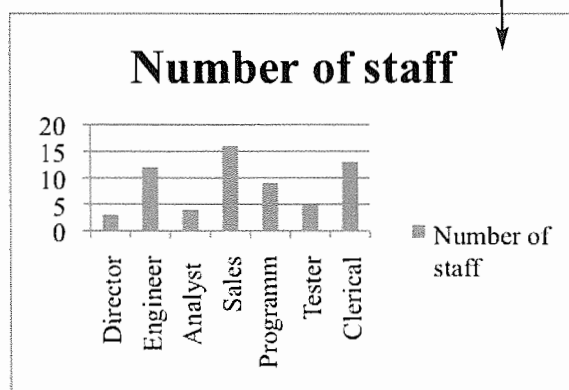
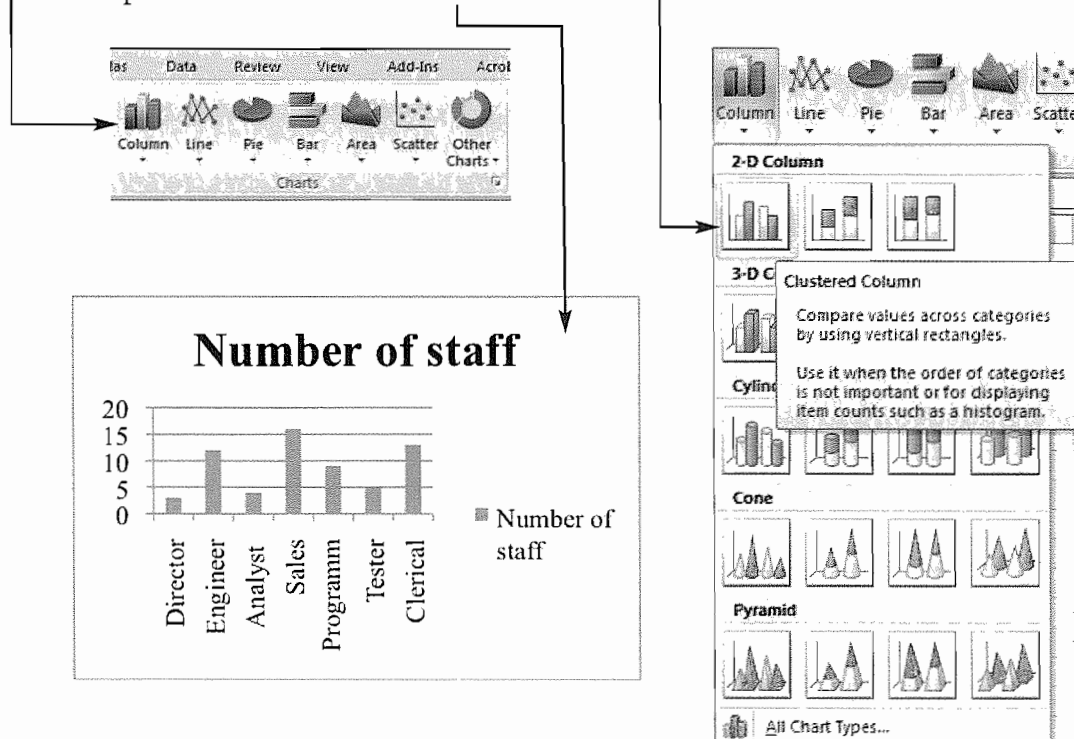
	A	B	C
1	JobTitle	Number of staff	Percentage
2	Director	3	0.0483871
3	Engineer	12	0.19354839
4	Analyst	4	0.06451613
5	Sales	16	0.25806452
6	Programmer	9	0.14516129
7	Tester	5	0.08064516
8	Clerical	13	0.20967742
9		62	

### Hint

Keep your charts simple – do not use 3D charts or add features that are not a necessary part of a task. A simple chart is more effective.

Decide what type of chart you will need for this task. Look at the data and decide if it compares parts of a whole; shows trends between two variables; or shows the difference. In this task, the data shows the different numbers of employees in each job type, so a bar chart is the most appropriate chart type and in this case you can use a vertical bar chart.

Select the **Insert** tab and find the **Charts** section. Then select a vertical bar chart (labelled **Column** in *Excel*) and select a **Clustered Column** chart from the drop-down options. The finished bar chart will look like this. Save this chart for later use.



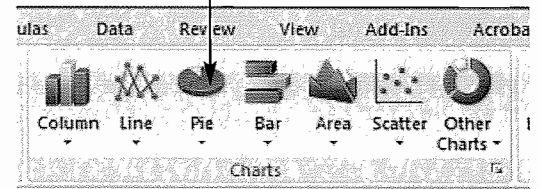
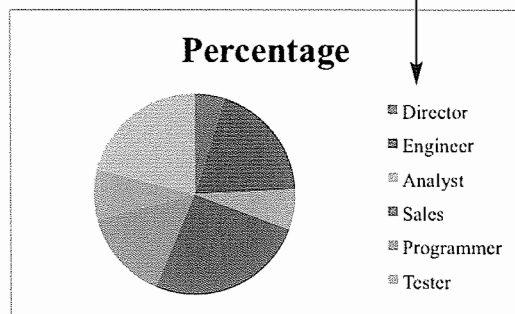
### Task I4y

Open the file EMPLOYEES.CSV. Create an appropriate graph or chart to show the percentage of employees with that job type.

Open the file and, using the <Ctrl> key and the mouse, highlight cells A1 to A8 and C1 to C8. Do not highlight any other cells. The highlighted spreadsheet should look like this.

	A	B	C
1	JobTitle	Number of staff	Percentage
2	Director	3	0.0483871
3	Engineer	12	0.19354839
4	Analyst	4	0.06451613
5	Sales	16	0.25806452
6	Programmer	9	0.14516129
7	Tester	5	0.08064516
8	Clerical	13	0.20967742
9		62	

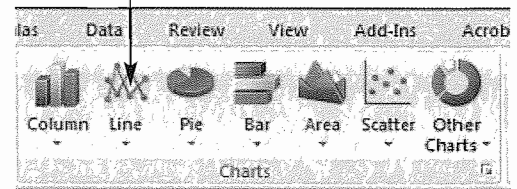
Decide what type of chart you will need for this task. Again, look at the data and decide if it compares parts of a whole; shows trends between two variables; or shows the difference. In this task, the data compares parts of the whole, so a pie chart is the most appropriate chart type. Select the **Insert** tab and find the **Charts** section. Then select a **Pie** chart and the **2-D Pie**. The finished pie chart will look like this. Save this chart for later use.



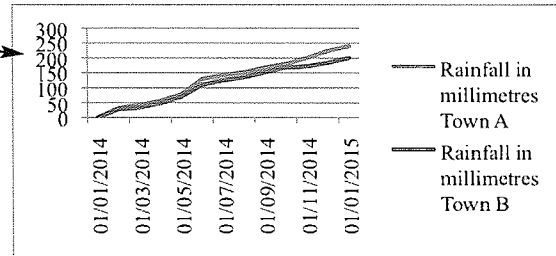
### Task I4z

Open the file RAINFALL.CSV. Create an appropriate graph or chart to show a comparison of the monthly data for towns A and B.

Open the file and highlight cells A1 to C15. Decide what type of chart you will need for this task. Again, look at the data and decide if it compares parts of a whole; shows trends between two variables; or shows the difference. In this task, the data shows trends between the date and the total amount of rainfall that had fallen by that date. Because specific dates are used and the rainfall is cumulative, a line graph is the most appropriate type. As there are two towns shown in the data, you will make a comparative line graph using both data sets. Select the **Insert** tab and in the **Charts** section select a **Line** graph and the **2-D Line** (the top left icon).



The finished line graph will look like this. Save this chart for later use.

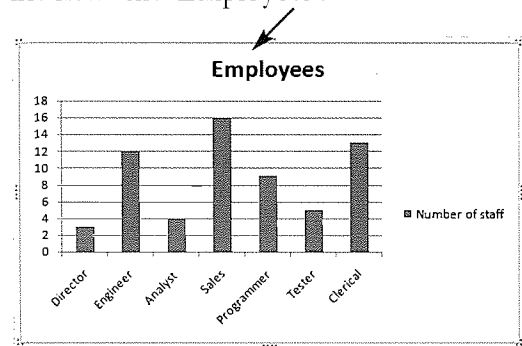
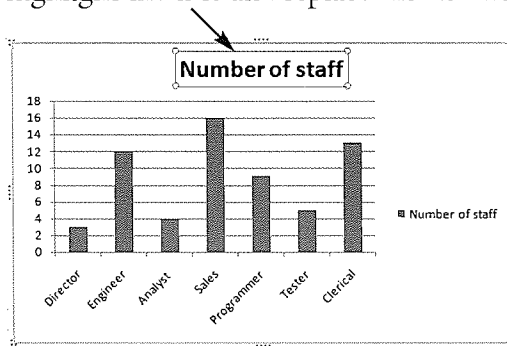


## Modifying a chart

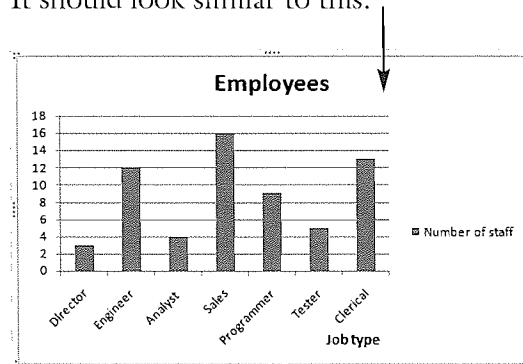
### Task 14aa

Open the chart saved in Task 14x. Add a chart title 'Employees', category axis label 'Job type' and value axis label 'Number of staff'. Do not display a legend.

Open the chart that you saved in Task 14x. Move the cursor onto the chart title and click the left mouse button on the title to select it, like this. With the title selected, highlight the title and replace the text with the new title 'Employees'.



You have to add a new axis label to the category axis. To do this select the **Insert** tab, then in the **Text** section select **Text Box**. Click the left mouse button on the chart near the category axis and type in 'Job type'. Resize the text box and change the font style, size, etc. to match the rest of the chart. Move the text box if necessary. It should look similar to this.



You can repeat this process to add the value axis label 'Number of staff', but you may find it quicker to highlight the text box for 'Job type', copy and paste it, then edit and move it. This will save time formatting the new text box to match the existing one. You can rotate the text through 90 degrees using the green handle.

After rotating the text, move the chart and place the value axis label to the left of the axis. To remove the legend (the key), click the left mouse button on the legend and then press the <Delete> key. Again, edit the layout of the chart so that it looks like this.



### Activity 14o

Open the file that you saved in Activity 14a. Use this data to produce a vertical bar chart comparing the number of days worked for each person, except Aminat and Sukrit. Add an appropriate title and labels to the chart. Do not include a legend.

### Activity 14p

Open the file WEBHITS.CSV. This contains data about the number of members for an online book club and the average number of website hits each week over a nine year period. Create and label an appropriate graph or chart to show a comparison of these two sets of data.

### Hint

It is worth spending time browsing through each of these chart layouts to see what is available.

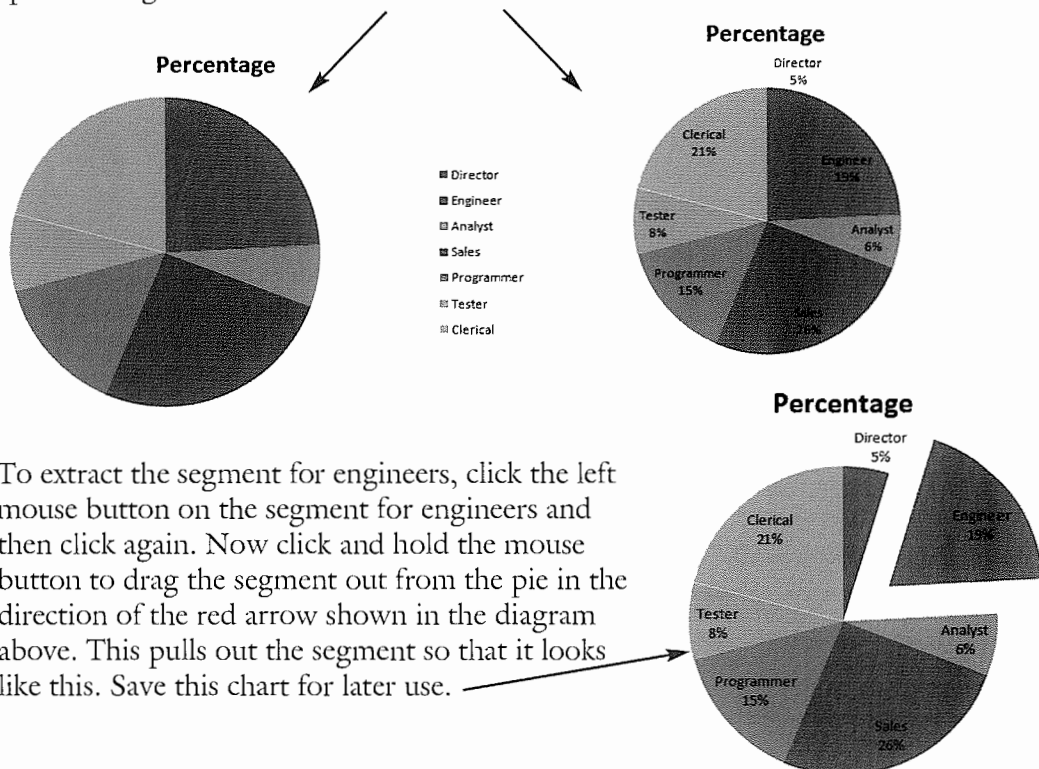
### Task 14bb

Open the chart saved in Task 14y.

Display all segment labels and percentage values on the chart. Do not display a legend.

Extract the segment for engineers.

Open the chart saved in Task 14y, click on the chart with the left mouse button and select the **Design** tab. Select from the **Chart Layouts** one which displays the segment labels and percentage values. Other layouts display the segment labels and values, some include a legend. Selecting the first option changes the chart from this to this.



To extract the segment for engineers, click the left mouse button on the segment for engineers and then click again. Now click and hold the mouse button to drag the segment out from the pie in the direction of the red arrow shown in the diagram above. This pulls out the segment so that it looks like this. Save this chart for later use.

### Activity 14q

Open the file that you saved in Activity 14m.

Create a pie chart showing the name of each house (the colours) and the percentage of the class in that house. Add the title 'Percentage of students in each house'. Extract the segment for the Yellow house.

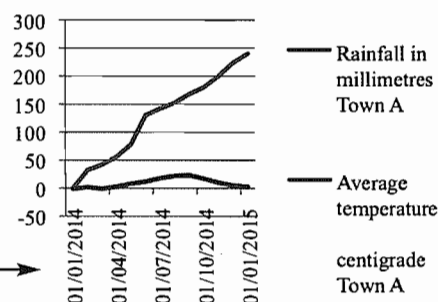
## Using secondary axes

### Task 14cc

Open the file RAINFALL.CSV.

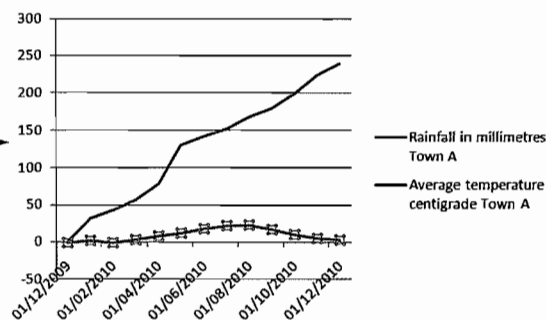
Create an appropriate graph or chart to show a comparison of the rainfall and average temperatures for each month in only town A. Add a second value axis to the chart for the temperature series and label and scale these axes appropriately.

Open the file RAINFALL.CSV and highlight the dates and data for Town A; this is in cells A1 to B15 and D1 to D15. Select the **Insert** tab and then in the **Charts** section select a **Line** graph. Use the top left option from those available (this will generally be the most frequently used choice). The line graph will look similar to this.

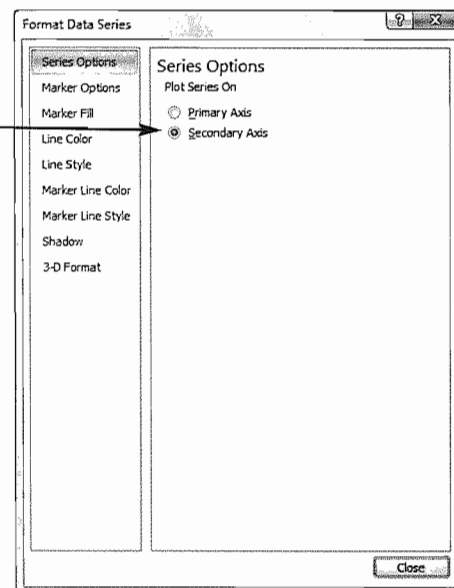
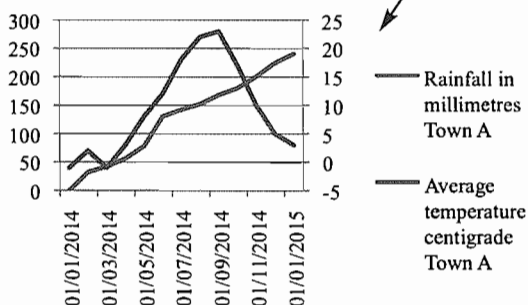


It is difficult to read the values for the temperature, so adding and scaling a second value axis will make it easier to read the graph.

Click the left mouse button on the data series for the temperatures (the red data line in this example), so that it shows each of the points plotted like this. Right click the mouse button on this data series to obtain the drop-down menu and select **Format Data Series....** This opens the **Format Data Series** window.

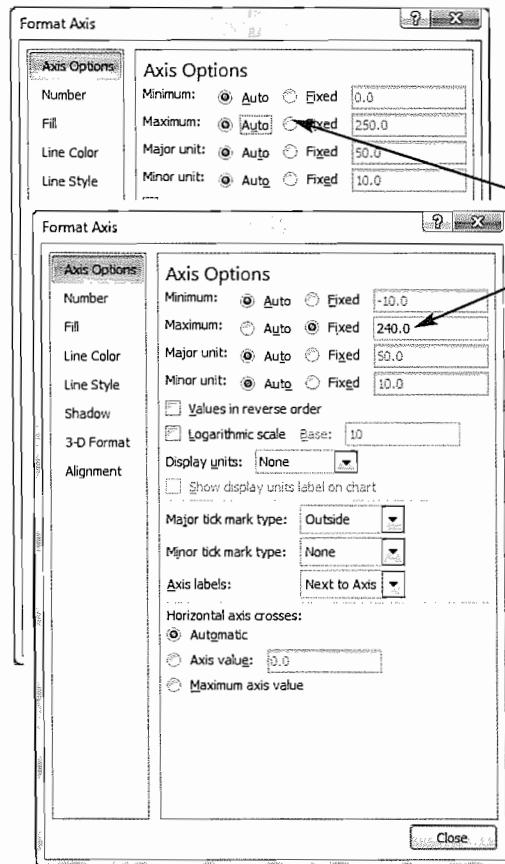
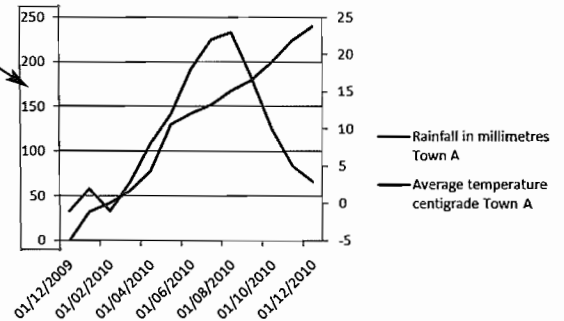


Select the **Series Options** section on the left (it may already be selected), and use the radio button to change the axis type from a **Primary Axis** to a **Secondary Axis**. Click on **Close**. Your graph will now look similar to this.



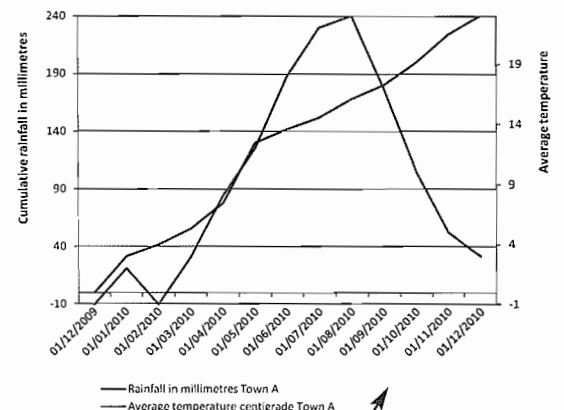
The secondary axis is now visible. Excel has attempted to scale these axes but you are now going to adjust them further. You will change the primary axis so that it is set between 0 and 240 and the secondary axis so that it is set between -1 and 23. These values have been extracted from the original data: the total cumulative rainfall is 240 millimetres, and the temperature changes between -1 and 23 degrees. It would be acceptable to use values like -2 to 24 or even the -5 to 25 suggested by *Excel* for this.

To change the primary axis values click on the axis labels like this.



Right mouse click within the axis labels to obtain the drop-down menu and select **Format Axis...** to open the **Format Axis** window. In the **Axis Options** section, change the **Maximum** value to a **Fixed** value using the radio button. Change the value to 240.0 and click on **Close**.

Follow a similar procedure for the secondary axis. Click the left mouse button on the axis, then right mouse click and select **Format Axis...** to open the **Format Axis** window. In the **Axis Options** section, change the **Minimum** value to a **Fixed** value of -1 and the **Maximum** value to a **Fixed** value of 23.



It is important to label these axes appropriately. Label the primary axis 'Cumulative rainfall in millimetres' and the secondary axis 'Average temperature'. These changes should leave the chart looking like this.

The legend has been moved so that all of the category axis labels are fully visible. In the earlier printout only every second label was visible. The category axis should also be labelled and the chart given a title before it is submitted for assessment. Save the file.

### Activity 14r

Open the file that you saved in Activity 14p.

Add a second value axis to the chart for the number of members and set the maximum value for this axis to 3200.



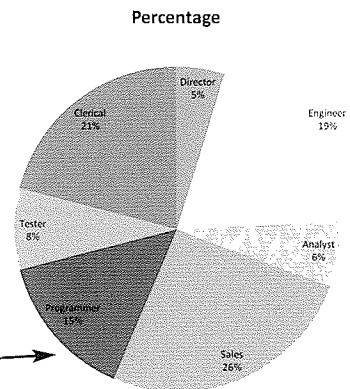
## Formatting graphs and charts

You have already learnt how to enhance a pie chart by extracting a segment or segments. Charts can also be enhanced using colour and/or shading. In some circumstances, the use of colour can be used to ensure that the person reading a document has their attention drawn to one specific part of a chart.

### Task 14dd

Open the chart saved in Task 14bb. Change this chart so that the segments for 'Programmer' and for 'Engineer' attract a reader's attention.

Open the chart saved in Task 14bb and click the left mouse button on the segment for 'Programmer' and then click again, so that only that segment is selected. Select the **Home** tab and in the **Font** section click on the **Fill** icon. Select a bright colour, for example red, from the colour palette. Repeat this process for the 'Engineer' segment, this time selecting bright yellow (bright orange may be better if printing the chart). Now select other softer colours for the other segments. The chart should look similar to this.



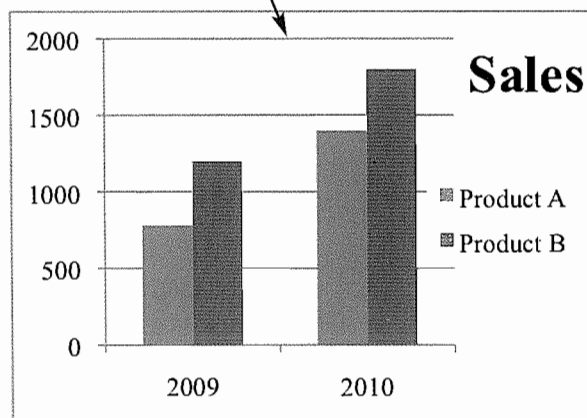
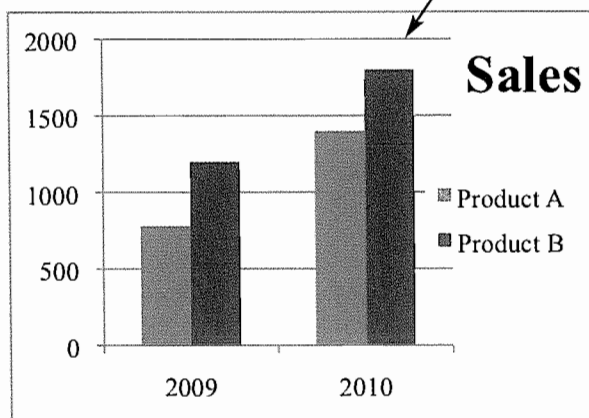
You can see that the brighter colours for the two segments stand out and the softer pastel colours are not as prominent.

### Activity 14s

Open the file that you saved in Activity 14q. Change the segment colours to match the labels for each segment.

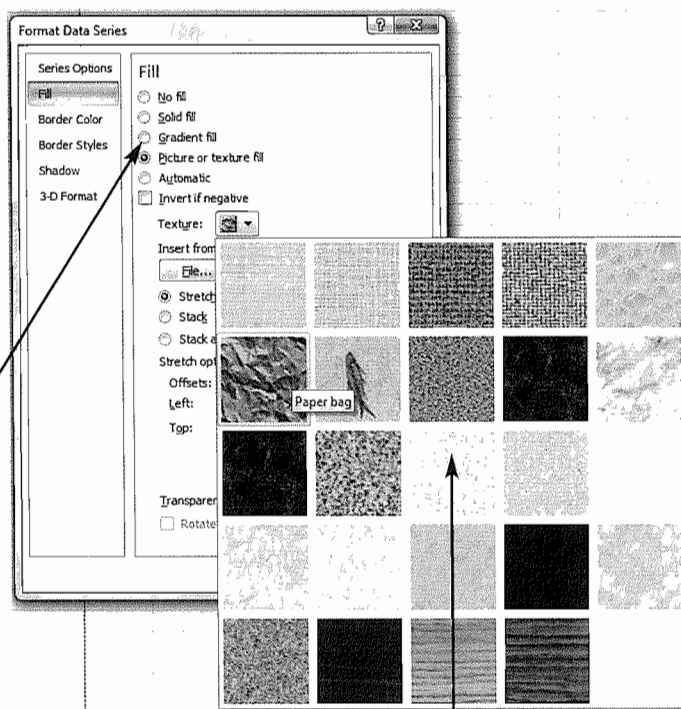
Using colour to enhance your charts is useful if you have a colour printer, but printing a document created in colour on a black-and-white printer can cause problems. This book has sections of coloured text designed to outline key elements, like words in the glossary shown in red, instructions to follow in blue and field names in green. If a page containing these three colours was printed on a black-and-white printer, each of the three colours would appear as a shade of grey. It would be impossible to identify which words were glossary terms, instructions or fieldnames.

With a black and white printer it is sometimes difficult to ensure that there is enough contrast between different parts of a graph or chart, for example this chart, appears like this if it is printed in greyscale (black and white).



#### Hint

An alternative is to use gradient fills which are also in the Fill section of the Format Data Series window.



In this case, choose more contrasting colours, like a very light and a dark colour, or use a patterned fill for one of the columns. To choose a patterned fill, click the right mouse button on one of the bars, in this case the right-hand bar. From the drop-down menu, select **Format Data Series...**, then in the **Format Data Series** window select the **Fill** section. Select the radio button for **Picture or texture fill** and choose a pattern from those available in the drop-down menu from the **Texture:** box. Click on **Close**.

Texture fills can also be applied to pie charts. Select a segment and right click the mouse button, then select **Format Data Point...** to edit the fill type.

#### Activity 14t

Open the file you saved in Activity 14s. Change the background fills so that each segment is distinctive when printed in black and white.

**In this chapter you will learn how to:**

- define and use HTML tags
- use a text editor to create a webpage
- display your webpages in a web browser
- format text using pre-defined styles
- align and enhance text
- create, edit and attach a cascading stylesheet
- create styles using specific and generic font families
- set font sizes using absolute and relative values
- use classes within a stylesheet
- annotate your markup with comments
- create numbered, bulleted and nested lists
- use colour names and hexadecimal colour codes
- apply colour to text and backgrounds
- use anchors and hyperlinks within a webpage, to external pages and to send email
- open a webpage in a new window
- design and create page layout using tables
- create and format tables, including header, footer and body sections
- insert, place and manipulate an image within a webpage
- manipulate an image in a graphics package
- create a hyperlink from an image.

For this chapter you will need these source files from the CD:

- |                    |                 |
|--------------------|-----------------|
| ■ ALIGN.CSS        | ■ SUBSCRIPT.HTM |
| ■ COLOUR_CODES.HTM | ■ TURTLE.JPG    |
| ■ CLASS1.CSS       | ■ WEBPAGE1.HTM  |
| ■ HTMLTIPS.HTM     | ■ WEBPAGE2.HTM  |
| ■ PCTC.JPG         | ■ WEBPAGE3.HTM  |
| ■ REMORA.HTM       | ■ WEBPAGE4.HTM  |
| ■ REMORA.JPG       | ■ WEBPAGE5.HTM  |
| ■ STYLE1.CSS       | ■ WEBPAGE6.HTM  |
| ■ STYLE2.CSS       | ■ WEBPAGE7.HTM  |
| ■ STYLE3.CSS       |                 |

## 15.1 Introduction

### What is a website?

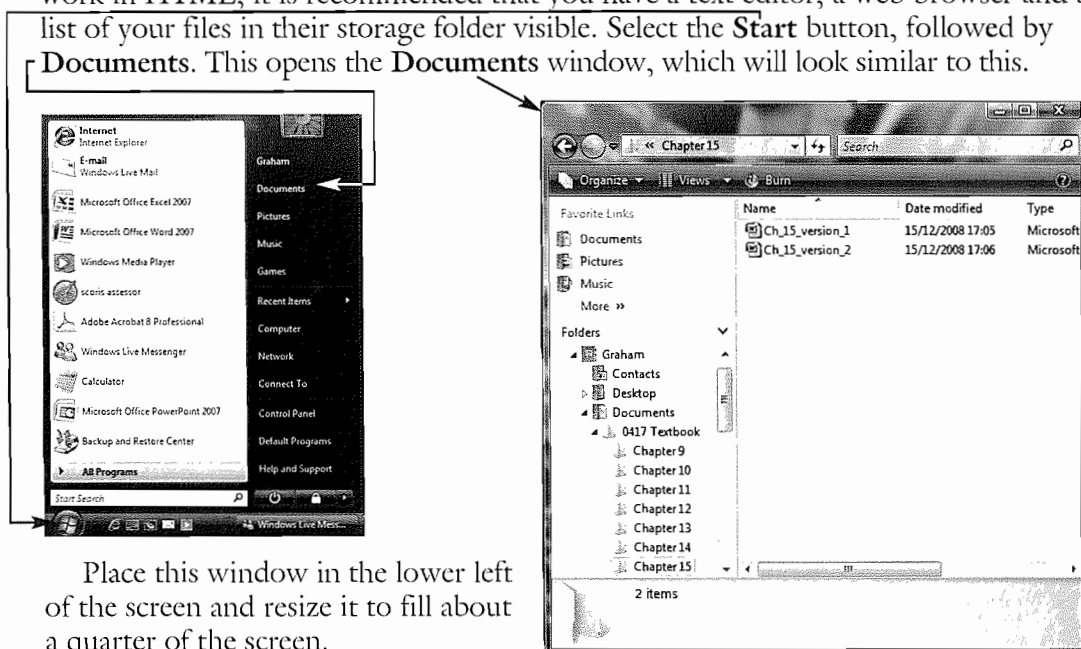
A **website** is a collection of individual but related **webpages** that are usually stored together and hosted by a web server. These can be programmed or created using different languages including **HTML**, *Sun Microsystems Java* and *Microsoft ASP*. Each webpage can include a variety of different objects such as text, images (including moving images) and sound. You are going to develop your webpages in **HTML**.

## What is HTML?

HTML is an abbreviation for HyperText Markup Language. It is a text-based language used to develop websites, and is often used within an intranet or on the Internet. Files are written in HTML using a simple **text editor** (or **web-authoring package** like *Macromedia Dreamweaver* or *Microsoft FrontPage*). Files are written in text format and are usually saved with an .htm file extension. These are file formats that are recognised as webpages by **web browsers** like *Microsoft Internet Explorer* or *Mozilla Firefox*. You are going to develop your webpages using a simple text editor.

## Getting started

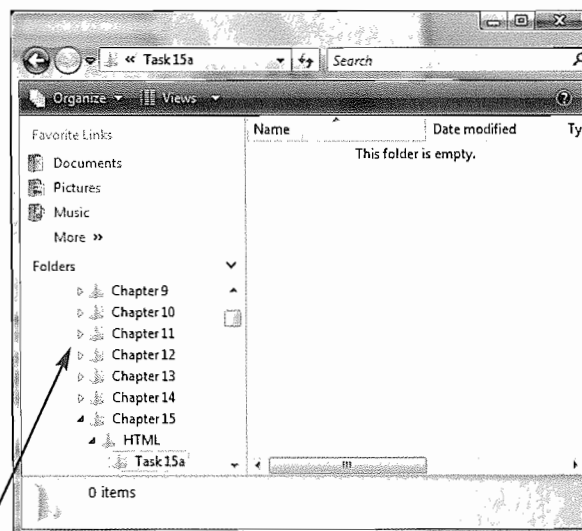
A good technique for working on webpages is to tile three windows on the screen at the same time: this means to fit them side by side like tiles. Whenever you do any work in HTML, it is recommended that you have a text editor, a web browser and a list of your files in their storage folder visible. Select the **Start** button, followed by **Documents**. This opens the **Documents** window, which will look similar to this.



Place this window in the lower left of the screen and resize it to fill about a quarter of the screen.

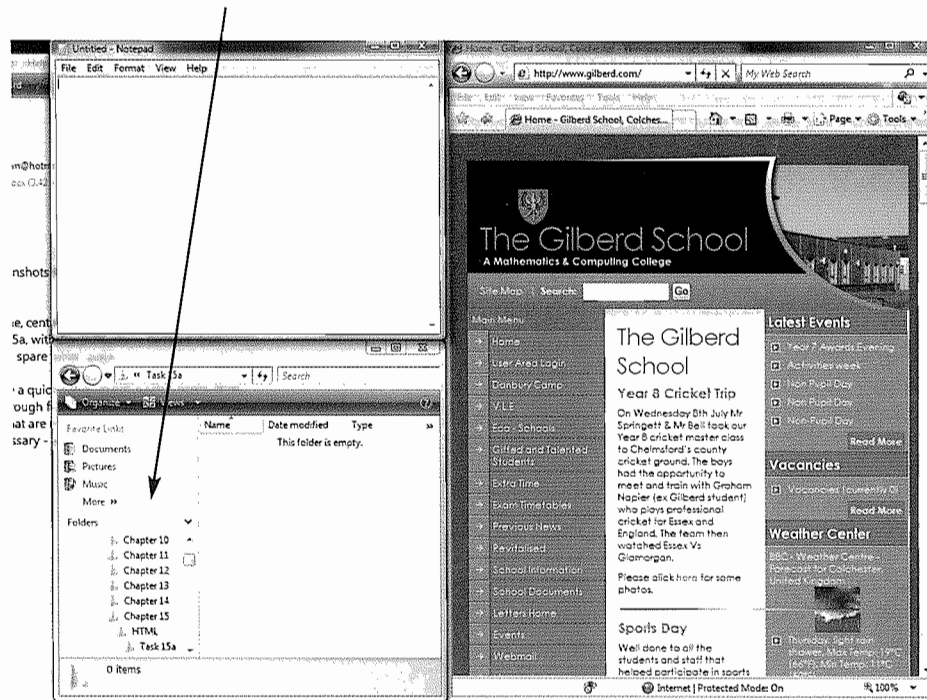
Create a new folder for your HTML work in your user area by clicking the right mouse button on the background for the file list on the right and selecting **New** followed by **Folder**. Rename this **HTML**. The location of this will depend on the structure of the system you are using. Go into this folder and create new sub-folders for each task in this chapter. Call these folders **Task 15a** to **Task 15w**. For each task in this chapter you *must* save all the files for that task in the correct folder.

Make sure you are in the folder **Task 15a**. This is where all the work from the first part of this chapter will be stored. The window should look similar to this.



Open your text editor; in this case you are going to open *Notepad*. This can be opened by selecting the **Start** button, followed by **All Programs**, **Accessories** and selecting **Notepad** from the list of programs. Place this window in the top left of the screen and resize it so that it fills about a quarter of the screen. The text editor will be where we write the HTML markup to create each webpage.

Open your web browser and resize this window so that it fills the remaining half of your screen. Make sure that the windows fit together and do not overlap. The screen will look similar to this.



### Hint

When using stylesheets later in this chapter you will have more than one copy of the text editor open and may need to tile these on the screen.

Although many people refer to HTML as a programming language, that is not strictly true. It is a markup language that uses a set of markup **tags** to describe a webpage to the browser. HTML tags are shown using angle brackets around them like this:

```
<html>
```

The angle brackets tell the browser that this is a markup tag and not text to be placed on the webpage. The browser does not display the HTML tags, but uses the tags to display the content of the page. Most HTML commands have pairs of tags, one to open the command and one to close the command. Each tag has a pair of angle brackets around it.

The first tag that will usually appear in any webpage will be **<html>**. This tag tells the browser that everything following this tag will be written in hypertext markup language. The tag **</html>** tells the browser that this is the end of the markup language. The forward slash shows that it is a closing tag. All other HTML tags will appear between these tags.

Each webpage will have two clearly defined sections, the head and the body. The head section starts with **<head>** and closes with **</head>** and objects between these tags are not usually displayed by the web browser. Only a few tags are universally accepted within the head section of a webpage, these are: **<base>**, **<link>**, **<meta>**, **<title>**, **<style>** and **<script>**. The body section starts with **<body>** and closes with **</body>** and objects between these tags should be

### Hint

Note that all text in HTML tags should be in lower case so that if it is structured correctly it would need little editing to become XHTML.

### Hint

If you look at other websites' HTML markup you may find a doctype definition before the `<html>` tag. This is normal but it is beyond the scope of this book. It will be needed if you wish to validate your webpages.

displayed by the browser. The body section should always contain a title. This is the name displayed in the browser toolbar. It is the page title if a page is added to **Favorites** and is the title displayed in search engine results. The basic structure of any webpage should therefore include these tags.

```
<html>
<head>
  <title>Webpage name</title>
</head>
<body>
  </body>
</html>
```

Insert tags for the head section here.

Insert objects to be displayed by the browser in the body section here.

## 15.2 Format text using pre-defined styles

### Hint

It is essential that the text is typed exactly as shown here. One typing error may cause the webpage not to function as expected.

All text added to a webpage should have a tag telling the browser what the text style should look like. There are a number of pre-defined styles available for use in a webpage. The normal paragraph style is obtained using `<p>` and ended with `</p>`. Likewise, six heading styles are available and are defined with the style names `<h1>` to `<h6>`.

### Task 15a

Create and save a new webpage showing paragraph and heading styles.

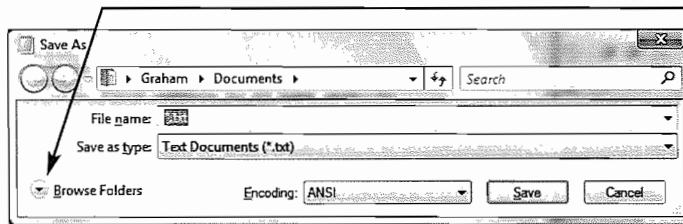
### Hint

It is acceptable to use capital letters in the text that is displayed on the page, but not in the tags.

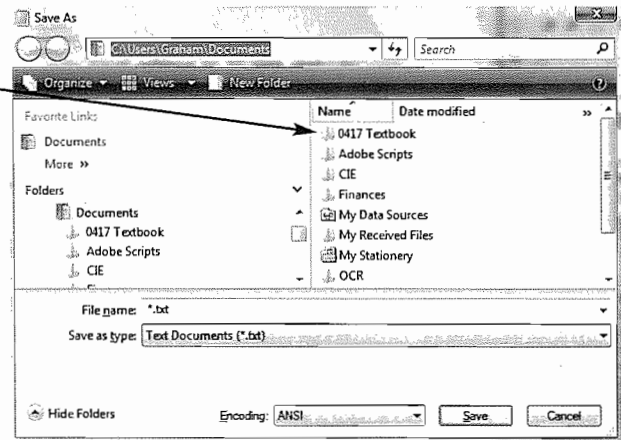
Click the cursor into the text editor. Type this markup into the editor, replacing MY NAME HERE with your name. Remember to always add your name, centre number and candidate number to all of your printouts.

```
<html>
<head>
  <title>Task 15a</title>
</head>
<body>
  <p>My first webpage by MY NAME HERE</p>
  <h1>This is style h1, the largest heading style</h1>
  <h2>This is style h2</h2>
  <h3>This is style h3</h3>
  <h4>This is style h4</h4>
  <h5>This is style h5</h5>
  <h6>This is style h6, smallest heading style</h6>
  <p>This is style p, the paragraph style</p>
</body>
</html>
```

When this has been entered and carefully verified (by checking this original document with your typed copy), you must select **File** followed by **Save As...**, which will open the **Save As** window. Click on **Browse Folders** to expand the window. The expanded window will look similar to this.





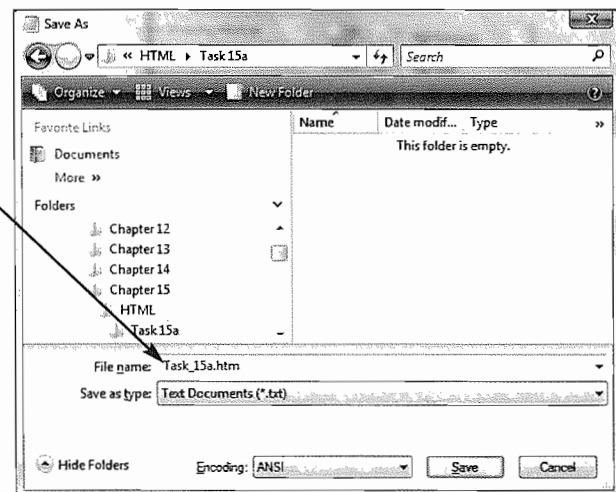
Click on the folder names until you find the Task 15a folder created earlier in this chapter.



You need to enter a filename for the webpage. This filename *must* be saved with an .htm extension. If you do not use an .htm file extension, this will operate as a text file rather than as a webpage. Enter the filename **Task\_15a.htm** and click on **Save**.

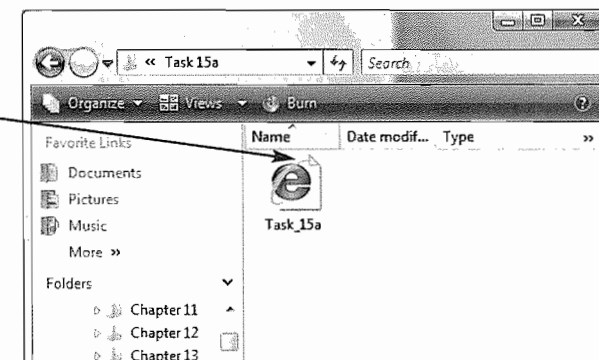
The file should appear in the **Documents** window and may look similar to this.

Make sure that the file displays the browser symbol  to show that this is a webpage and not the text document symbol  symbol only



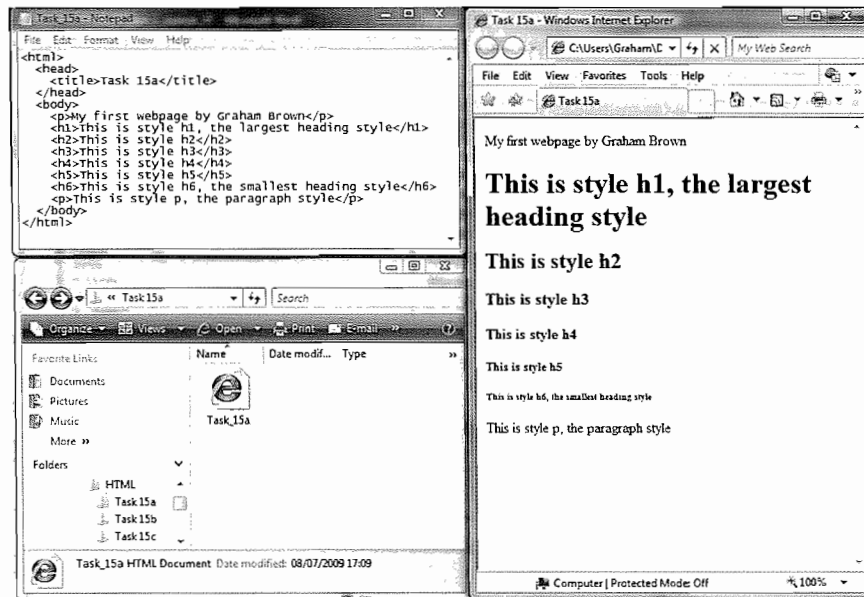
### Hint

Some browser settings will make this open in a new browser window, rather than the one that you have just opened.



appears if you forget to add the .htm extension to the filename.

Select the file Task\_15a from the **Documents** window and drag this file (holding the left mouse button down) into the browser window. The screen should now look similar to the screen shown overleaf. The browser view now contains your first webpage.



## 15.3 Opening existing webpages and enhancing text

To open an existing webpage in both the text editor and the web browser you must first find the website in the **Documents** window. For all webpage files, including those given in the examination, it is advisable to copy the files into a sub-folder of your HTML directory before starting.

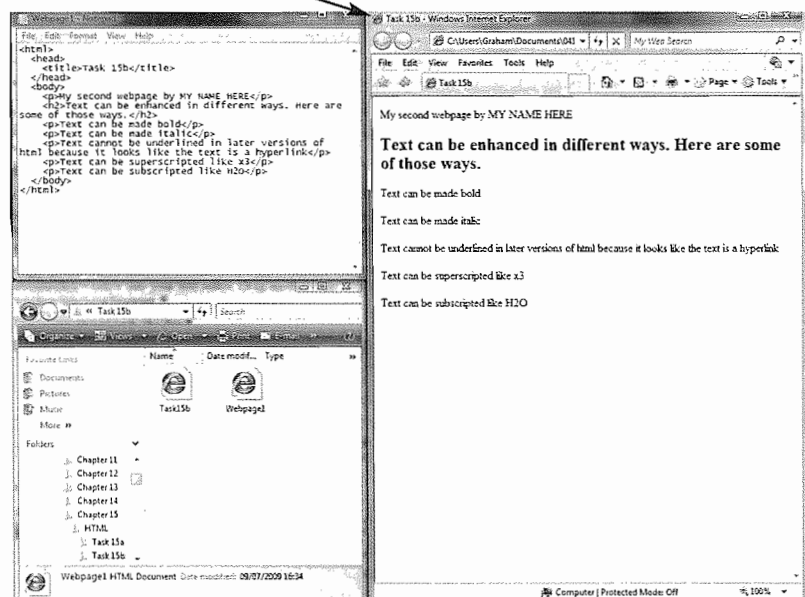
### Task 15b

Open the file **WEBPAGE1.HTM** and view this webpage in both the text editor and browser. Improve this webpage by emboldening the word 'bold', setting the word 'italic' to an italic font, setting the 3 in x3 as a superscripted character and setting the 2 in H2O as a subscripted character.

Copy the file **WEBPAGE1.HTM** into your Task 15b folder. Drag this file from the **Documents** window into your text editor. Drag another copy of this file from the **Documents** window into your browser. The screen should look like this.

### Hint

Editing is easier if you ensure that the word wrap is selected in Notepad. To do this, use the **Format** menu and check that the **Word Wrap** option is ticked.





**Hint**

If you prefer you can click the mouse on the browser window and then press the function key <F5> to refresh the browser view each time you have saved the file.

Move the cursor into the text editor window and make the following changes to the markup.

Replace the word 'first' with 'second'.

Replace MY NAME HERE with your name.

Place the tags <b> and </b> around the word 'bold'.

Place the tags <i> and </i> around word 'italic'.

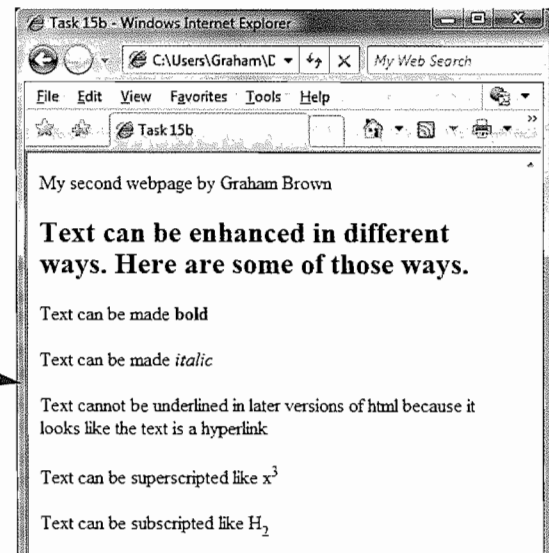
Place the tags <sup> and </sup> around the number '3'.

Place the tags <sub> and </sub> around the number '2'.

When you have made all these changes to the webpage, save the page by selecting the text editor, followed by **File, Save As...**, selecting the Task 15b folder and entering the filename **Task\_15b.htm** before clicking on **Save**.

Test the webpage works by dragging this new filename from the **Documents** window into the browser window. The new browser view should look like this.

```
<html>
<head>
  <title>Task 15b</title>
</head>
<body>
  <p>My second webpage by Graham Brown</p>
  <h2>Text can be enhanced in different ways. Here are
some of those ways.</h2>
  <p>Text can be made <b>bold</b></p>
  <p>Text can be made <i>italics</i></p>
  <p>Text cannot be underlined in later versions of html
because it looks like the text is a hyperlink</p>
  <p>Text can be superscripted like x<sup>3</sup></p>
  <p>Text can be subscripted like H<sub>2</sub></p>
</body>
</html>
```

**Activity 15a**

Open the file SUBSCRIPT.HTM and view this webpage in both the text editor and browser.

Improve this website by emboldening the word 'emboldened' and setting the word 'italic' to an italic font.

Set the 2 in 10 metres<sup>2</sup> and the 3 in 500 cm<sup>3</sup> as superscripted characters and set the 2 in CO<sub>2</sub> as a subscripted character.

## 15.4 Working with styles

### Hint

Remember to always add your name, centre number and candidate number to all of your printouts. You will not gain any credit in the practical examinations if there is nothing to identify the candidate on the printout.

Using **styles** in your webpages helps you to be consistent in the way the pages look. Using styles is much quicker and easier than applying individual settings, such as font face, font size, text alignment and font colours, to every piece of text in each webpage that you create.

You have already met the heading styles h1 to h6 and the paragraph style p earlier in the chapter. When you used these styles the web browser did not find any of these style definitions in your HTML markup so used its own default settings. However, you can set your own definitions for each style and the web browser will attempt to apply these styles to the page. Styles are not only set for text, but can also be used to define page layout, colour schemes and default settings for other objects and links on the page. Using consistent styles is often important to give a 'corporate feel' to a website. Particular elements like colour schemes, logos and font faces are sometimes used to aid recognition of well-known companies or brands.

Styles are always defined in the head section of a webpage. They may be defined in each webpage or defined in a **stylesheet**. If stylesheets are used, the stylesheet is attached to the webpage in the **head** section of the markup. Although styles can be applied individually to each page, it is more efficient to write, edit and attach one or more common stylesheet/s to all the pages in a website.

### Hint

If you attach more than one stylesheet to a webpage at the same time, those attached later in the markup have priority over earlier ones.

## Using stylesheets

You have already used different styles in your webpages, for example text set as a heading style (h1 to h6) or paragraph style. These styles are often gathered together and held in a stylesheet. This is a collection of styles saved in a different file in **cascading stylesheet (.css)** format.

One or more of these cascading stylesheets can be attached to a webpage, and the styles in the stylesheet will be applied to this page. Where more than one webpage is used, the styles only have to be defined once and attached to all webpages. This allows companies to develop different stylesheets for specific items like corporate colour schemes, corporate text styles and styles for a particular document or set of documents.

### Hint

Copy all HTML exactly as shown, including any spaces.

### Task 15c

Open a copy of the webpage that you saved in Task 15a.  
Apply the stylesheet STYLE1.CSS to this page and save this webpage.  
Change the attached stylesheet to STYLE2.CSS and save this with a new filename.

Select the folder called Task 15c in your **Documents** window. Copy the file Task\_15a.htm into this folder. Rename this file as Task\_15c.htm. Open this file in your text editor and in your web browser. Copy the files STYLE1.CSS and STYLE2.CSS into this folder.

Change the title of the webpage to Task 15c. To apply the styles from the stylesheet STYLE1.CSS you must attach it to the webpage. Move the cursor to the text editor containing the HTML and add this line of text below the title tags in the head section of the markup.

This defines the relationship of this link as a stylesheet, in cascading stylesheet format and searches for the file style1.css and applies this to the page. Your finished markup should look like this. Save this webpage. View this webpage in your browser.

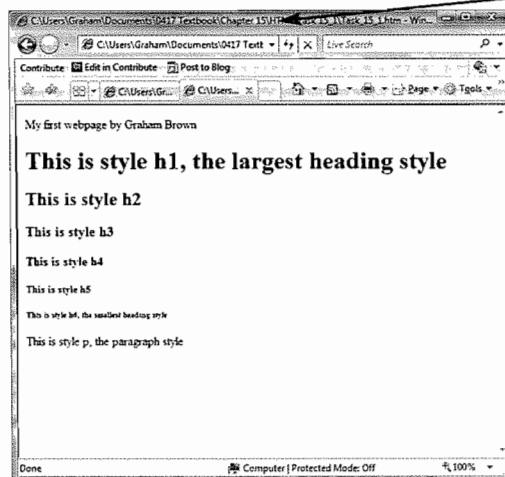
```
<link rel="stylesheet" type="text/css" href="style1.css">

<html>
<head>
  <title>Task 15c</title>
  <link rel="stylesheet" type="text/css" href="style1.css">
</head>
<body>
  <p>My first webpage by MY NAME HERE</p>
  <h1>This is style h1, the largest heading style</h1>
  <h2>This is style h2</h2>
  <h3>This is style h3</h3>
  <h4>This is style h4</h4>
  <h5>This is style h5</h5>
  <h6>This is style h6, the smallest heading style</h6>
  <p>This is style p, the paragraph style</p>
</body>
</html>
```

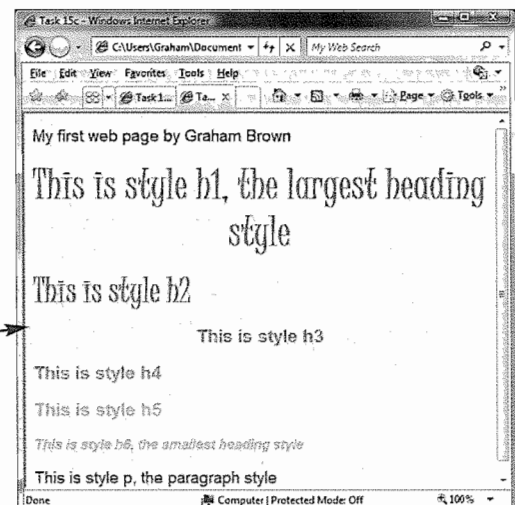
### Hint

The browser settings on your computer may show you different fonts to those shown here.

You will notice that your webpage has changed from this to this.



The page content has not changed but the styles applied to the page are very different. Notice that the font face, sizes, colours and alignment have all been specified in the stylesheet. This stylesheet is a poor example because it contains too many variations. If you change the markup to attach STYLE2.CSS to the page rather than STYLE1.CSS, you should see something like this.



### Reminder

In this book:

HTML markup is in blue text.

A stylesheet is in red text.

This is the same webpage again, but with the slightly improved stylesheet STYLE2.CSS, which has a background colour defined in the stylesheet. You will discover how to create and amend these stylesheets in Section 15.5.

## 15.5 Creating a cascading stylesheet

It is very easy to create a cascading stylesheet in your text editor. The structure of a .css file has a few very simple rules. Stylesheets do not have tags in them as they are not a markup language. Each style has a style name which is called a selector. The selector is followed by curly brackets {}. Inside these curly brackets go the property for the style, followed by a colon and the property's value. For example, if you want to set the text in style h1 to be centre aligned it would appear like this. (Note the American spelling of 'center'.)

Each style can have a number of properties and values. If there is more than one property then each property is followed by a semi-colon. For example if you want to set the text in style h1 to be centre aligned, 16 points high and bold it would appear like this.

If a value within a style contains more than one word, it must be placed in speech marks like this.

Stylesheets are saved with a .css format (in a similar way to saving in .htm format) from the text editor.

### Hint

A serif font is one which has small lines or strokes (called serifs) at the ends of characters like this:

**Serif**

A font that does not contain serifs is known as a sans serif font.

### Hint

Any number of spaces can be placed between the style name and the opening bracket. This does not change how the browser interprets the markup, but sometimes makes it easier for us to read the markup.

### Font families

Individual fonts can be specified, but these are not always available in all browsers, so there are a number of **generic font families**, including **serif** and **sans serif** fonts, that can also be used. These include 'serif', 'sans-serif', 'cursive', 'fantasy' and 'monospace', which has proportional spacing. The generic font family must always be listed after the other preferred font/s. The **font-family** property must contain a hyphen. In the example above, the **font-family** is set so that the browser will look at the list of fonts installed in the machine, and will try to find Times New Roman first (it is in speech marks in the stylesheet because there are spaces in the font name); if it cannot find it, it will find any generic serif font that is available.

### Task 15d

Open a copy of the webpage that you saved in Task 15c. Create a new stylesheet called **SERIF.CSS** that sets all the styles as generic serif fonts. Apply this stylesheet to your webpage. View the webpage in your browser.

Change the generic settings in the stylesheet to a different generic font style. Save the stylesheet with a new name. Try all the generic style settings to see what each one looks like.

Select the folder called Task 15d in your **Documents** window. Copy the webpage you saved in Task 15c into this folder and rename the file as **Task\_15d.htm**. Open this file in your text editor and in your web browser. Edit the title of the webpage so it becomes Task 15d. To attach the stylesheet to the webpage you must edit the third line of the markup so that it becomes:

`<link rel="stylesheet" type="text/css" href="serif.css">`

**Hint**

This technique could save you time which can be invaluable in a practical examination.

Save the webpage. You are going to create the stylesheet by opening a second copy of the text editor. Enter the following style definitions into it.

Carefully verify your stylesheet by checking this original document with your typed copy. Save the file using the filename SERIF.CSS. Refresh your browser so that you can see the effects that this has on the webpage.

```
h1 {font-family: serif}
h2 {font-family: serif}
h3 {font-family: serif}
h4 {font-family: serif}
h5 {font-family: serif}
h6 {font-family: serif}
p {font-family: serif}
```

**Grouping style definitions**

As all the styles have the same values for the **font-family** property, you can group all of the styles together and change the value only once. This stylesheet can be simplified to this single line.

Edit it and save it so that it replaces the old version.

Refresh the browser to check that it still works.

Edit this stylesheet so that it sets the **font-family** to 'sans-serif'. Save this file using the filename SANS-SERIF.CSS. Change the markup in the HTML to link to this file and save this webpage. Repeat this process for each of the other generic font families.

**Font size**

Font size can be specified by setting absolute values, by setting values relative to each other, or a mixture of both.

**Absolute values** can be used to set the number of **points** or **picas** or the number of **pixels** high for each character. If point sizes are used, there are 72 points to an inch, so a 28 point font will be about 1 centimetre tall. This will not be affected by the size or resolution of the monitor. The sizes specified are set as numbers with 'pt' to show it is in points, for example an 18 point font is written as 18pt. Some webpages are created using the measurement in picas, which is abbreviated as 'pc' and is the equivalent of 12 points, so a 2 pica font size would be the same as a 24 point font. A pixel is one dot on a computer monitor. This means that pages will appear differently depending upon the size and resolution of the monitor used. For older style monitors, 1 pixel was often about the same size as 1 point, but full high definition (HD) monitors now mean that characters appear much smaller on these devices. The abbreviation for pixels is 'px'. Other absolute values include 'in' to show the measurement in inches, 'cm' for centimetres or 'mm' for millimetres.

**Task 15e**

Open a copy of the webpage and stylesheet that you saved in Task 15d. Edit this stylesheet so that style h1 is 36 points high, h2 is 24 points, h3 18 points, h4 16 points, h5 14 points, h6 12 points and the paragraph style is 12 points high.

Change these settings to try and get similar results using the settings for pixels (the number will depend upon your monitor display settings), picas, inches, centimetres and millimetres.

Because all of the font settings are different in this case, it is more sensible to keep all of the settings for each style together. It is possible to produce a stylesheet that gives these results like this.

Although this works, it would be easier to edit if all of the settings for each style definition are together like this.

```
h1,h2,h3,h4,h5,h6,p {font-family: serif}
h1 {font-size: 36pt}
h2 {font-size: 24pt}
h3 {font-size: 18pt}
h4 {font-size: 16pt}
h5 {font-size: 14pt}
h6 {font-size: 12pt}
p {font-size: 10pt}
```

```
h1 {font-family: serif; font-size: 36pt}
h2 {font-family: serif; font-size: 24pt}
h3 {font-family: serif; font-size: 18pt}
h4 {font-family: serif; font-size: 16pt}
h5 {font-family: serif; font-size: 14pt}
h6 {font-family: serif; font-size: 12pt}
p {font-family: serif; font-size: 10pt}
```

Amend the markup for the webpage to link to the new stylesheet (SIZE.CSS) and save this in your Task 15e folder. Save the new stylesheet as SIZE.CSS in the same folder. Refresh your browser so that you can see the effect that this has on the webpage. Use trial and error to try and get similar results with the other absolute size settings.

**Relative values** are often based upon previously defined values for the fonts, as defined by the default browser settings. Two values are shown using the

abbreviations 'em' and 'ex'. 1 em is the same as the current font size, 2 em is twice the current font size, etc. This can be useful as this automatically selects the default fonts set by the user in other stylesheets or by the browser. 1 ex is about half the height of the current font size and is the measured height of the letter 'x'.

### Task 15f

Open a copy of the webpage and stylesheet that you saved in Task 15e. Edit the stylesheet so that the paragraph style is 16 points high. Set style h1 so that it is 3 em, h2 is 2 em, h3 1.5 em, h4 3 ex, h5 2 ex and h6 so that it is 1.5 ex.

Open the webpage saved in Task 15e and edit this to attach the stylesheet SIZE2.CSS to it. Save this as Task\_15f.htm in the folder Task\_5f. Open the stylesheet SIZE.CSS and edit it so that it changes the font sizes like this. Save this stylesheet as SIZE2.CSS. View the webpage with this stylesheet attached. Notice the difference in the em and ex sizes.

Other relative values frequently used in cascading stylesheets are **percentage values**, for example setting the font size to 200 per cent would force the font to be twice the size of the current setting. Using percentage

```
p {font-family: serif; font-size: 16pt}
h1 {font-family: serif; font-size: 3em}
h2 {font-family: serif; font-size: 2em}
h3 {font-family: serif; font-size: 1.5em}
h4 {font-family: serif; font-size: 3ex}
h5 {font-family: serif; font-size: 2ex}
h6 {font-family: serif; font-size: 1.5ex}
```

values allows you more flexibility in the relative sizes of the fonts, which can be very useful if classes are used. You will meet these later in this section. There is also a set of pre-defined relative sizes that can be used. These are: 'xx-small', 'x-small', 'small', 'medium', 'large', 'x-large' and 'xx-large'. Other acceptable relative values are 'smaller' and 'larger', which can be very useful if defining different classes within a style.

**Task 15g**

Open a copy of the webpage and stylesheet that you saved in Task 15f. Edit this stylesheet so that style h1 is xx-large, h2 is x-large, h3 is large, h4 is medium, h5 is small, h6 is x-small and the paragraph style is xx-small.

Open the webpage saved in Task 15f and edit this so that the stylesheet SIZE3.CSS is attached to it. Save this as Task 15g.htm. Open the stylesheet SIZE.CSS and edit this so that it changes the font sizes like this.

Save this stylesheet as SIZE3.CSS. View the webpage with this stylesheet attached.

```
h1 {font-family: serif; font-size: xx-large}
h2 {font-family: serif; font-size: x-large}
h3 {font-family: serif; font-size: large}
h4 {font-family: serif; font-size: medium}
h5 {font-family: serif; font-size: small}
h6 {font-family: serif; font-size: x-small}
p {font-family: serif; font-size: xx-small}
```

**Aligning text****Hint**

For centre aligned text, note the American spelling for center.

A font style (or class within a style) can be aligned in one of four different ways. You can use the **text-align** property to format text so that it is left aligned, centre aligned, right aligned or fully justified, as shown in this sample stylesheet.

```
h1 {text-align: left}
h2 {text-align: center}
h3 {text-align: right}
h4 {text-align: justify}
```

**Task 15h**

Open the file you saved in Task 15b. Add a new title 'Aligning text' in style h1. Change the word 'second' to read 'third'.

Set the heading style h1 to be centre aligned. Set style h2 to be right aligned. Set style p to be left aligned. Place a horizontal line below the title 'Aligning text'.

Place additional blank lines before the title at the top of the page and after the horizontal line.

Open the webpage saved in Task 15b and edit this by attaching a new stylesheet called ALIGN.CSS. Add the title 'Aligning text' in style h1. Change the word 'second' in the paragraph style so that it becomes 'third'. Save this as Task\_15h.htm in your Task\_15h folder.

Create a new stylesheet like this called ALIGN.CSS.

```
h1 {text-align: center}
h2 {text-align: right}
h3 {text-align: left}
```

Set h1 to be centre aligned, h2 right aligned and p to be left aligned. Save this stylesheet. Check that this works and that the styles have been applied correctly like this.

To place a horizontal line below the title you use the horizontal rule tag. This is one of the few single tags that are used in HTML. It does not have an open tag and a close tag. The tag appears like this.

<hr>

**Hint**

Line breaks should not be used to split a paragraph into two. Each paragraph should have its own style definition.

**Aligning text**

My third webpage by Graham Brown

**Text can be enhanced in different ways. Here are some of those ways.**

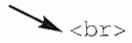
Text can be made bold

Text can be made *italic*

Text cannot be underlined in later versions of HTML because it looks like the text is a hyperlink

Text can be superscripted like x<sup>3</sup>

Text can be subscripted like H<sub>2</sub>

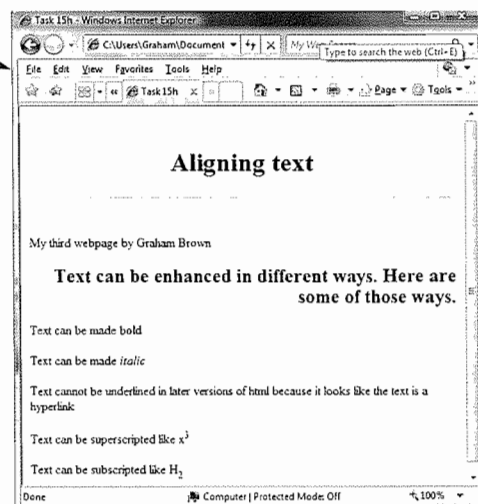
To insert a blank line before the title, move to the correct position in the markup and insert a line break tag. Again this is a single tag and appears like this. 

This tag must appear within a style, for example between the `<h1>` and `</h1>` tags, or between the `<p>` and `</p>` tags. Place another line break below the horizontal rule. Save the webpage again. The markup and page should look like this.

### Hint

The carriage returns within the HTML have no effect on the layout of the webpage.

```
<html>
<head>
  <title>Task 15h</title>
  <link rel="stylesheet"
type="text/css" href="align.css">
</head>
<body>
  <h1><br>Aligning text</h1>
  <hr>
  <p><br>My third webpage by Graham Brown</p>
  <h2>Text can be enhanced in different ways.
Here are some of those ways.</h2>
  <p>Text can be made <b>bold</b></p>
  <p>Text can be made <i>italic</i></p>
  <p>Text cannot be underlined in late version:
of html because it looks like the text is a
hyperlink</p>
  <p>Text can be superscripted like
x<sup>3</sup></p>
  <p>Text can be subscripted like
H<sub>2</sub></p>
</body>
</html>
```



## Enhancing text within a stylesheet

You are going to use some similar techniques to those used for Task 15b. This time the enhancements will apply to the whole style (or class of style as you will see later in this chapter). Each of the enhancements uses a different property setting. The default value for all three enhancements is normal. To get bold text, set the **font-weight** property to 'bold', like this.

To italicise text, set the **font-style** property to 'italic', like this.

To underline text, set the **text-decoration** property to 'underline', like this.

```
h1 {font-weight: bold;
    font-style: italic;
    text-decoration: underline}
```

### Hint

Although the underline command is no longer part of html, it can still be used by setting it within a style in the stylesheet.

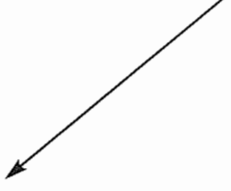
### Task 15i

Create a new stylesheet called MYSTYLE1.CSS and attach this to the webpage called WEBPAGE2.HTM. This stylesheet will set style h1 to a bold, italic, 18 point font. If 'Times New Roman' is available the browser will use that, otherwise it will choose 'Times', but if this is not available any other serif font will be used. Make this text centre aligned.



Copy the file WEBPAGE2.HTM into your Task 15i folder. Open this file in your web browser and text editor. Enter this markup to create a new stylesheet called MYSTYLE1.CSS. Refresh this file in your web browser.

```
h1 {font-family: "Times
New Roman", Times, serif;
font-size: 18pt;
text-align: center;
font-weight: bold;
font-style: italic}
```



### Activity 15b

Create a new stylesheet called MYSTYLE2.CSS and attach this to the webpage called WEBPAGE3.HTM. This stylesheet will set style:

- h1 as an italic, centre aligned, 24 point font. If 'Helvetica' is available the browser will use that, otherwise it will choose 'Arial Narrow' but if this is not available any other sans-serif font will be used.
- h2 as a bold, right aligned, 16 point font. If 'Courier Narrow' is available the browser will use that, otherwise it will choose 'Courier' but if this is not available any other proportional spaced font will be used.
- h3 as an underlined, left aligned, 16 point font. If 'Courier Narrow' is available the browser will use that, otherwise it will choose 'Courier' but if this is not available any other proportional spaced font will be used.
- p as a 14 point, left aligned, serif font.

Print evidence of your stylesheet and the browser view of the webpage with the stylesheet attached.


## Using classes within a cascading stylesheet

### Hint

Notice that each property and its value/s are on a new line. This makes it easier to read and check for mistakes.

You can define different classes which are sub-types within an element in a stylesheet. You can define a class in the stylesheet by using the . (dot or full stop) symbol. These are very useful for adding to or changing styles without defining completely new styles. For example, this stylesheet defines the style h1 in the normal way. It also defines a class that can be used with any style to change the colour and alignment of the style that it is applied to.

```
h1 {text-align: left}
.right {color: blue;
text-align: right}
```

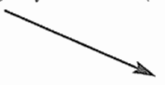


### Task 15j

Open the stylesheet called CLASS1.CSS and add a new class within this stylesheet that changes the default style to be right aligned and blue. Open the webpage called WEBPAGE4.HTM and apply this class to each line of text that starts with the word 'This'.

Copy the files CLASS1.CSS and WEBPAGE4.HTM into your Task 15j folder and rename WEBPAGE4.HTM as Task\_15j.htm. Open these files in your text editor and the file Task\_15j.htm in your web browser. Add this markup to the stylesheet and save this in cascading stylesheet (.css) format.

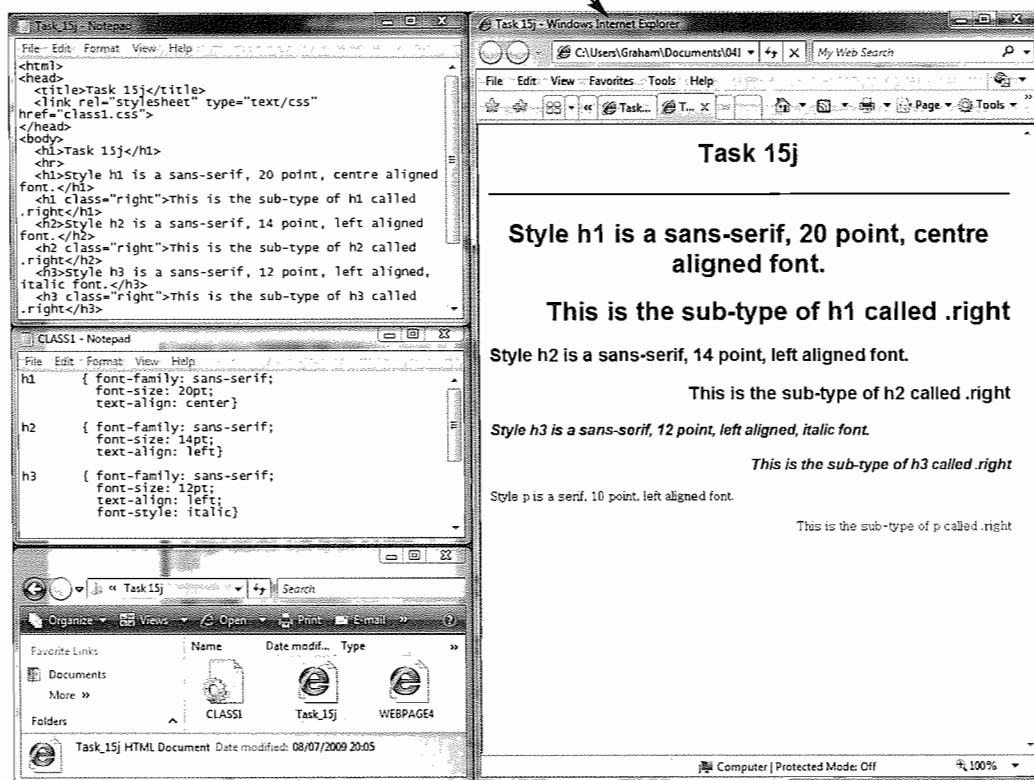
```
.right {color: blue;
text-align: right}
```



Enter the highlighted markup to the webpage to add a class sub-type to each line starting with the word 'This'. It should look like this.

```
<html>
<head>
  <title>Task 15j</title>
  <link rel="stylesheet" type="text/css" href="class1.css">
</head>
<body>
  <h1>Task 15j</h1>
  <hr>
  <h1>Style h1 is a sans serif, 20 point, centre aligned font.</h1>
  <h1 class="right">This is the sub-type of h1 called .right</h1>
  <h2>Style h2 is a sans-serif, 14 point, left aligned font.</h2>
  <h2 class="right">This is the sub-type of h2 called .right</h2>
  <h3>Style h3 is a sans-serif, 12 point, left aligned font.</h3>
  <h3 class="right">This is the sub-type of h3 called .right</h3>
  <p>Style p is a serif, 10 point, left aligned font.</p>
  <p class="right">This is the sub-type of p called .right</p>
</body>
</html>
```

The screen should now look similar to this.



You can see from this printout that the original style definitions (except for the text alignment) have all been applied to the page. The text alignment and colour have been added to the styles using the class called 'right'.

## Using comments in your markup

Comments can be used to annotate your markup. Each comment appears within a single tag. The exclamation mark followed by two hyphens (dashes) opens the comment and two hyphens close the comment. An example of comments in the markup looks like this.

```
<html>
<!-- This is a comment. Comments are not displayed in
the browser -->
<!-- Markup created by Graham Brown-->
<!-- This section defines the header of the webpage-->
<head>
```

## 15.6 Working with lists

You can include on a webpage either a numbered list, which is called an **ordered list**, or a bulleted list, which is called an **unordered list**. Bulleted (unordered) lists can also be nested (placed one inside the other) to give you more flexibility in the design of your webpages. Items to be placed in a list start with the markup `<li>` and close with `</li>`. These are used in the same way as the style definitions for headings (styles h1 to h6) and paragraph styles. Each item in the list must have the list tags around it. An example of an item placed in a list would look like this.

```
<li>This is one item from a bulleted or numbered list </li>
```

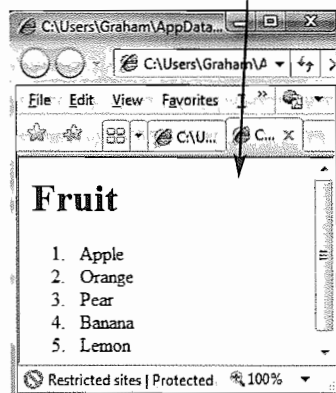
## Numbered lists

Numbered lists are called ordered lists in HTML. Place the tag `<ol>` at the start of the numbered list and the tag `</ol>` at the end.

### Task 15k

Create a webpage containing the heading 'Fruit' and a numbered list for the following items: Apple, Orange, Pear, Banana and Lemon.

Enter this markup into your text editor. Save the webpage, which should look like this in your browser.



```
<html>
<!-- Task 15k by your name -->
<head>
  <title>Task 15k</title>
</head>
<body>
  <h1>Fruit</h1>
  <ol>
    <li> Apple </li>
    <li> Orange </li>
    <li> Pear </li>
    <li> Banana </li>
    <li> Lemon </li>
  </ol>
</body>
</html>
```

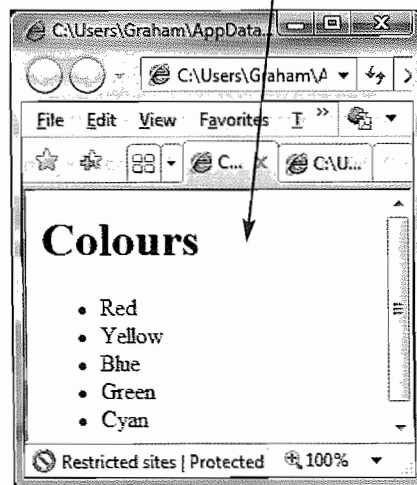
## Bulleted lists

Bulleted lists are called unordered lists in HTML. Place the tag `<ul>` at the start of the numbered list and the tag `</ul>` at the end.

### Task 15l

Create a webpage containing the heading 'Colours' and a bulleted list for the following items: Red, Yellow, Blue, Green and Cyan.

Enter this markup into your text editor. Save the webpage, which should look like this in your browser.



```
<html>
<!-- Task 15l by your name -->
<head>
  <title>Task 15k</title>
</head>
<body>
  <h1>Friut</h1>
  <ul>
    <li> Apple </li>
    <li> Orange </li>
    <li> Pear </li>
    <li> Banana </li>
    <li> Lemon </li>
  </ul>
</body>
</html>
```

## Nested lists

Bulleted lists can be nested, by having sub-lists. These are created by placing one unordered list within another list.

### Task 15m

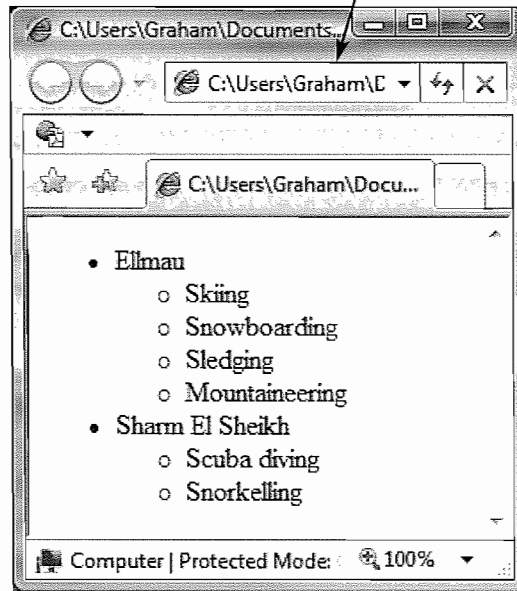
Create a webpage containing the names of two resorts as a bulleted list. These resorts are: Ellmau in Austria and Sharm El Sheikh in Egypt. For each resort, list the main activities available.

Enter this markup into your web editor to create the primary list.

```
<html>
<!-- Task 15m by your name -->
<head>
  <title>Task 15km</title>
</head>
<body>
  <ul>
    <li> Ellmau </li>
    <li> Sharm El Sheikh </li>
  </ul>
</body>
</html>
```

After each resort, enter a new sub-list that contains the activities offered in each of these places. Note that the sub-list fits between the list item name and the close tag for that item. The finished markup will look like this.

Save the webpage, which should look like this in your browser.



```
<html>
<!-- Task 15m by your name -->
<head>
  <title>Task 15m</title>
</head>
<body>
  <ul>
    <li> Ellmau
      <ul>
        <li> Skiing </li>
        <li> Snowboarding </li>
        <li> Sledging </li>
        <li> Mountaineering </li>
      </ul>
    <li>
      <li> Sharm El Sheikh
        <ul>
          <li> Scuba diving</li>
          <li> Snorkelling</li>
        </ul>
      </li>
    </ul>
  </body>
</html>
```

### Activity 15c

Create a new webpage containing the heading 'Winter sports', a brief introduction and an unordered list of the following winter sports: skiing, tobogganing and snowboarding. For each winter sport, make a sub-list of the items of clothing required. Set these sub-lists as unordered lists.

Print the webpage as viewed in your browser and as html.

Change these sub-lists to ordered lists. Again, print the webpage as viewed in your browser and as html.

## 15.7 Working with colour

Colour in HTML can be defined in two ways. One method is to use colour names, like red, green and blue within the html code. There are currently only 16 colour names accepted as web standards in HTML, CSS and by the World Wide Web Consortium (known as W3C). These are: aqua, black, blue, fuchsia, gray (note the American spelling), green, lime, maroon, navy, olive, purple, red, silver, teal, white and yellow. Other colour names are, however, accepted by the major browsers and a table showing these colours and their names is included on the CD. This can be found on the webpage called COLOURCODES. You can open this webpage and use these colours in your own stylesheets attached to your webpages.

It is not always easy to remember the names of the colours, and many web designers prefer to use hexadecimal codes (often referred to as hex codes) to define the colour of text, backgrounds or objects. Hexadecimal is a counting system where counting is done in 16s rather than in the 10s used in the decimal system. Because we do not have sixteen different characters for numbers, we use letters and numbers as shown in Table 15.1.

Decimal	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	...
Hexadecimal	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	10	11	12	13	14	15	16	17	18	19	1A	1B	...

Decimal	...	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	...
Hexadecimal	...	98	99	9A	9B	9C	9D	9E	9F	A0	A1	A2	A3	A4	A5	A6	A7	A8	A9	AA	AB	AC	...

**Table 15.1** The hexadecimal counting system

### Hint

This table will help you work out which hex codes are useful in the practical examinations.

The largest number that can be stored in a single **byte** of information is the decimal number 255, which is FF in hexadecimal.

Each pixel (dot) on a monitor or projected onto a screen is made up of three different colours. The primary colours when using light (which is very different from the primary colours used in painting) are red, green and blue. You will notice that the initial letters are RGB, hence RGB monitors. Each of these colours can be off, partially on or fully on. In hexadecimal, if a colour is off it is set to 00 and if it is fully on it is set to FF. To create the colour for any pixel you must tell the computer how much red, green and blue light to show. This means that all colour codes have six characters, the first two being red, the next two green and the final two blue.

This example is the hex code for red, as the red component is fully on (FF), the green component is off (00) and the blue component is also off (00).

→ `color = #FF0000`

All of the different combinations of red, green and blue allow more than 16 million different colours to be used. You do *not* need to learn the hex codes for the exam. Using a small number of values for each colour (like those shown in the table in the hint box) is more than enough.

Amount of light (colour)	Hex code	Example (red only)	Colour
Fully on	FF	FF0000	
3/4 on	C0	C00000	
1/2 on	80	800000	
1/4 on	40	400000	
off	00	000000	

The webpage COLOURCODES contains the hex codes (as well as the names) for the most popular colours. It is interesting to note that, working with light, mixing red and green gives yellow, green and blue gives cyan and mixing red and blue gives magenta. If all three colours are fully on, the result is white and no colours on gives black.

**Task 15n**

Create a new stylesheet called MYSTYLE3.CSS which sets the font styles:

- h1 to Times New Roman, or Times, or any serif font
- h1 to be 36 points high, black and centre aligned
- h2 to Arial, or Helvetica, or any sans-serif font
- h2 to be 24 points high, red and left aligned
- h3 to Arial, or Helvetica, or any sans-serif font
- h3 to be 18 points high, blue and right aligned
- p and li to Arial, or Helvetica, or any sans-serif font
- p and li to be 14 points high, dark blue, left aligned.

Open the webpage called WEBPAGE5.HTM and attach this stylesheet to it.

Copy the file WEBPAGE5.HTM into your Task 15n folder. Open this file in your text editor and in your web browser. Create a new stylesheet in a second copy of your text editor. For each style, add the font family, size and alignment as shown in previous sections.

The colour for each style is added using the color property and the value (note the American spelling of colour). For this example, the values will be in hexadecimal so that we can select from any of the 16 million available colours. You use the # symbol to tell the browser that the following six characters are hexadecimal. For h1 we will set the colour to black using #000000, h2 to red with #FF0000, h3 to blue with #0000FF and dark blue for the paragraph style with #000080. The final markup should look like this.

```
h1      {font-family: "Times New Roman", Times, serif;
        font-size: 36pt;
        text-align: center;
        color: #000000}

h2      {font-family: Arial, Helvetica, sans serif;
        font-size: 24pt;
        text-align: left;
        color: #FF0000}

h3      {font-family: Arial, Helvetica, sans serif;
        font-size: 18pt;
        text-align: right;
        color: #0000FF}

p, li   {font-family: Arial, Helvetica, sans serif;
        font-size: 14pt;
        text-align: left;
        color: #000080}
```



Save this with the filename MYSTYLE3.CSS. Add this markup to the head section of the webpage to attach your new stylesheet. Save your webpage and test it in your browser. The finished page

```
<title>Task 15n</title>
<link rel = "stylesheet" type="text/css" href
      ="mystyle3.css">
</head>
```

should look like this.

**Task 15o**

Using the webpage and stylesheet from Task 15n, add an extra stylesheet called MYSTYLE4.CSS that defines classes to change the text colour to red, yellow or green and adds enhancements like black bold and blue italic. Apply these styles in the webpage, so that each of the bulleted items has the correct colours and enhancements.

Set a khaki background to the webpage and make sure that all text is clearly visible.

**Hint**

Even though you may choose your own class names in the practical examinations, try to make them short and meaningful. Try to avoid using words that mean something in html, e.g. use 'rd' rather than 'red'.

Copy all the files from your Task 15n folder into the Task 15o folder. From the Task 15o folder, open the file MYSTYLE3.CSS in your text editor and the webpage in both the text editor and your web browser. In another copy of your text editor, create a new stylesheet called MYSTYLE4.CSS. In this stylesheet you are going to add classes. Some will change the font colours and some will add enhancements to make text bold or italic.

Like each style, each class is given a name. You will need to decide on the name for each class, which should be short but meaningful. In this example you can use the names 'rd' for the red class, 'yllw' for yellow, 'grn' for green, 'ital' for italic and blue, and 'bld' for the bold and black class. Create each class in your stylesheet. The final markup should look like this. Save this with the filename MYSTYLE4.CSS.

```
.rd      {color: #FF0000}
.yllw    {color: #FFFF00}
.grn     {color: #00FF00}
.ital    {font-style: italic;
          color: #0000FF}
.bld     {font-weight: bold;
          color: #000000}
```

Add this markup to the head section of the webpage to attach your new stylesheet.

```
<title>Task 15o</title>
<link rel="stylesheet" type="text/css"
      href="mystyle3.css">
<link rel="stylesheet" type="text/css"
      href="mystyle4.css">
</head>
```

Note that this stylesheet has been attached after the previous stylesheet, so if there were any clashes in style definitions, those in MYSTYLE4.CSS would take priority. These classes need adding to each style definition within the webpage. Edit the markup and save the webpage. The markup should look like this.

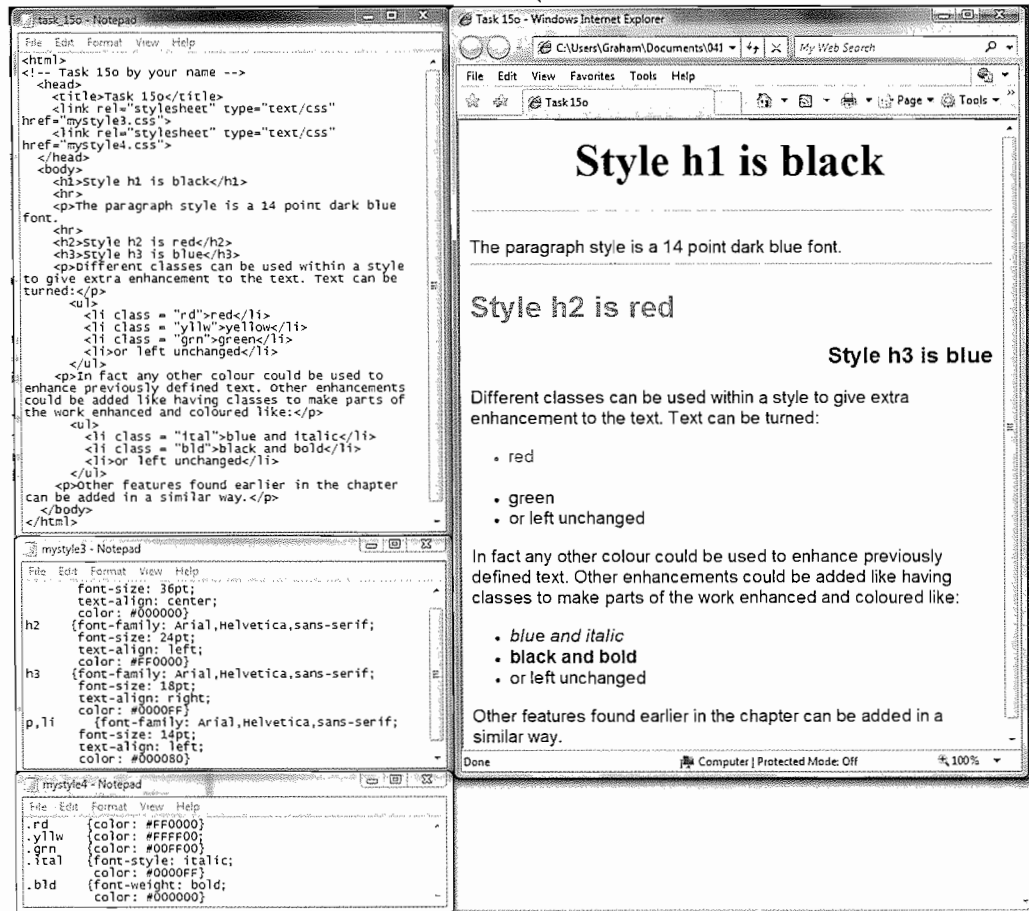
```
<ul>
  <li class = "rd">red</li>
  <li class = "yllw">yellow</li>
  <li class = "grn">green</li>
  <li>or left unchanged</li>
</ul>
```

<p>In fact any other colour could be used to enhance previously defined text. Other enhancements could be added like having classes to make parts of the work enhanced and coloured like:</p>

```
<ul>
  <li class = "ital">blue and italic</li>
  <li class = "bld">black and bold</li>
  <li>or left unchanged</li>
```



The webpage will look similar to this.



## Background colour

Background colour can be added to many features of webpages, including the entire webpage, text on the page or, as you will see in Section 15.9, other objects like tables. In the original versions of HTML the colour was set in markup of the page rather than in a stylesheet, but many of the original commands have now been deprecated so all background colour settings are performed within the stylesheet.

The background colour for a page is set in the body style of the stylesheet. Edit the stylesheet MYSTYLE4.CSS to add the body style setting for the khaki (hex code #F0E68C) background like this.

```
body {background-color: #F0E68C}
```

When you have applied this to the webpage, it is difficult to read the yellow text, so to make sure that all the text is fully visible, you are going to change the background colour of the yellow text to a contrasting colour.

extra enhancement to the text. Text can be turned:

- red
- green
- or left unchanged

In fact any other colour could be used to enhance

This again is set in the stylesheet, by adding the background colour to the definition in the class 'yllw', so the stylesheet looks like this.

```
.rd      {color: #FF0000}
.yllw    {color: #FFFF00;background-color: #00008B}
.grn     {color: #00FF00}
.ital    {font-style: italic; color: #0000FF}
.bld     {font-weight: bold; color: #000000}
body     {background-color: #F0E68C}
```

The background colour has been applied with the yellow font colour like this.

extra enhancement to the text. Text can be turned:

- red
- yellow
- green
- or left unchanged

In fact any other colour could be used to enhance

### Activity 15d

Create a webpage with a pale blue background that is about using colour in websites. Attach a stylesheet that defines classes to change the text colour to red, yellow, green, dark green, blue, dark blue or magenta. Have three different styles for the dark blue text, one for left aligned, one for centre and one for right. Apply these styles in the webpage, so that each colour is used appropriately.

## 15.8 Using hyperlinks

A **hyperlink** is a method of accessing another document or resource from your current application. Hyperlinks do not just relate to webpages: other applications software can also use them. Hyperlinks are often used to create menu options with webpages, using either text or images. When you select a hyperlink (usually by clicking the left mouse button), the hyperlink will perform an action. It may move your position within a page, open another page either locally or on the internet, or open your email editor so that you can send an email to a specified place or company.

### Anchors

An anchor is a point of reference within a webpage. It is similar to a bookmark when using word-processing or desktop publishing software. If you create a webpage that will not fit in a single window, it is useful to use one anchor for each section of the webpage (or document), so the user can move to any section without having to scroll through the whole document. An anchor starts with an `<a>` tag and closes with a `</a>` tag. One common use of an anchor is to define the top of a page. This anchor is often called 'top' or 'start'. To create an anchor called 'top' enter this markup in the body section of the page. This anchor will work without any text between the open and close tags.


```
<body>
<a name="top">Any content could appear here</a>
```

## Hyperlinks within a webpage

### Task 15p


Open the webpage WEBPAGE6.HTM and stylesheet STYLE3.CSS. Edit the webpage so that each new section contains an anchor. Use these anchors to create hyperlinks from the appropriate text in the first paragraph. Make the word 'top' in the last line a hyperlink to the top of the page. Make the words 'CIE website' a hyperlink to the website [www.cie.org.uk](http://www.cie.org.uk) and the words 'W3C website' a hyperlink to [www.w3.org](http://www.w3.org).

Copy the files WEBPAGE6.HTM and STYLE3.CSS into your Task 15p folder. Open the webpage in your text editor and in your web browser. Each section needs an anchor with a name. Each anchor name must be different. You should always choose short yet meaningful names for each anchor. For this webpage you will use the anchor names top, 15a, 15b, 15c, 15d, 15e and 15f as these relate directly to the sections within the webpage. It is sensible to place all the anchor names into the document before creating the hyperlinks to these anchor names. Each anchor name is created like this.



```
<h1><a name="top"></a>Chapter 15</h1>
```

You can see that the anchor tags are inside the tags defining the style for the text. The initial anchor tag contains the anchor name which is placed in speech marks. This name will be used in all hyperlinks to this point. Add the other anchors to the markup, one for each section of the document like this.




```
<hr>
<h2><a name="15a"></a>15a Understand what html is</h2>
<p>Many students sit the practical examinations without really

<hr>
<h2><a name="15b"></a>15b Problems with WYSIWYGs</h2>
<p>There are many well designed WYSIWYG packages on the market, some are

<hr>
<h2><a name="15c"></a>15c Use the correct terms</h2>
<p>Over the past few years, as the practical examinations have developed
```

Add anchors for 15d, 15e and 15f with similar markup. In the final sentence, find the word 'top'. This will be used to create a hyperlink to the anchor with the name top that you created earlier. The hyperlink is also created using an anchor. The two anchor tags are placed each side of the word top. The markup includes a hyperlink reference (the markup for this is href) and the name of the destination anchor. This anchor name is always inside speech marks and preceded by the # symbol like this.



```
<p>Back to the <a href="#top">top</a></p>
```

In the first paragraph find the text 'what is html'. Edit the markup for this text so that it creates a hyperlink to the anchor named 15a. It will look like this.

`<h3>Here are practical tips for the exams, if you follow them you are likely to increase your marks. First you need know <a href="#15a">what is html? </a> Once you have a sound understanding of html, it is worth`

You need to add similar markup to the text 'WYSIWYGs', 'use the right terms', 'create and attach stylesheets', 'work with tables' and 'other resources'. The finished markup for this section should look like this.

`<h1>Hints and tips for the practical examinations?</h1>  
<h3>Here are practical tips for the exams, if you follow them you are likely to increase your marks. First you need know <a href="#15a">what is html?</a> Once you have a sound understanding of html, it is worth considering the use of <a href="#15b">WYSIWYGs</a> and the potential problems of using these packages. Make sure that you <a href="#15c">use the right terms</a> to describe what you have done, are doing or could be asked to do. Learn how to <a href="#15d">create and attach stylesheets</a> to your webpages. Make sure that you can <a href="#15e">work with tables</a>. These provide a fundamental structure to webpages and seem to be replacing frames in many areas. There are other methods of formatting layout including the use of DIVs, but these are currently beyond the scope of this book. Look for <a href="#15f">other resources</a> to help you prepare for the practical examinations.</h3>`

Now that the hyperlinks have been created, each one needs testing. Save the webpage and refresh your browser, then try each hyperlink in turn and make sure that it directs you to the correct place in the webpage. If the name that you have used in the hyperlink reference does not exist, your browser will go to the top of the page and the browser does not show you that there is an error.

## Hyperlinks to other webpages

Hyperlinks can be created to another webpage stored locally, usually in the same folder as the current webpage, or to an external website on the internet. The markup for both of these links has the same syntax (structure). The only difference is the address of the webpage that the hyperlink is to go to. To complete task 15p, two hyperlinks need adding to external web addresses. These follow a similar format, with the URL for the web address appearing as the hyperlink. The markup for these two hyperlinks is shown overleaf.


```

<h2><a name="15f"></a>15f Other useful links</h2>
..<p>There are other places that can be used to gain valuable
information that may help. These include the
<a href="http://www.cie.org.uk">CIE website</a> and the
<a href="http://www.w3.org">W3C website</a>.</p>
<p>Back to the <a href="#top">top</a></p>

```

Add these hyperlinks in to the last section of your markup and save your webpage. Test the hyperlinks to make sure they work as you expected.

References to pages stored in the same folder as your webpage just have an address without the URL. To link to a local file called 'next\_page.htm', you would include a hyperlink reference like this.



```

<p><a name="next_page.htm">Click here for the next page</a>.<p>

```

### Hint

Make sure that you do not put an absolute address in a hyperlink reference (for example, `<a href="C:\my documents\my folder\html\next_page.htm">`) as this is only likely to work on your computer. Other computers are unlikely to have the same folder structure and filename.

### Hint

Although in these simple examples the target attributes open new windows, they operate in new frames. Frames are beyond the scope of this book. Some recent browsers with multiple tabs (like *Internet Explorer 7 and 8*) over-ride these settings, as frames are not used.

### Activity 15e

Open the webpage HTMLTIPS.HTM and stylesheet STYLE3.CSS. Replace the text 'YOUR NAME' with your name.

Edit the webpage so that each new section contains an anchor. Use these anchors to create hyperlinks from the appropriate text in the first section. Make the word 'top' in the last line a hyperlink to the top of the page.

Make the word 'CIE' a hyperlink to the website [www.cie.org.uk](http://www.cie.org.uk), the words 'Hodder Education' a hyperlink to the website [www.hoddereducation.co.uk](http://www.hoddereducation.co.uk) and the text 'W3C' a hyperlink to [www.w3.org](http://www.w3.org).

Print the html view of this webpage.

## Opening a webpage in a new browser window


When a webpage is opened, it may open in the current window or it may open in a new window. This is set using the **target attribute**. An attribute is something that is added to one of the markup commands to give further information/instructions to the browser. This attribute is part of the anchor and tells the browser which window to use for the webpage that you are going to open. The **target attribute** can either be set as a default setting in the head section of the markup, or as an individual setting for a hyperlink within the body section. If the **target attribute** is not used, the browser will decide where to open a webpage.

To set a target window for a single hyperlink, add the **target attribute** to the first anchor. Some **target attributes** have specific functions. If a target name of **\_blank** is applied, this will open in a new target window. If **\_self** is applied it will open in the current window. Other target names such as **\_parent** and **\_top** are reserved and perform different functions with frames, which are beyond the scope of this book. Any other target name that you use will open the specified webpage in a window with that target name if it exists, or open it in a new window with that target name.

### Task 15q

Using the webpage and stylesheet from Task 15p, make the hyperlink to the W3C website open in the same window and the hyperlink to the CIE website open in a new target window called **\_cie**.

Copy the file STYLE3.CSS and the webpage that you saved in Task15p from your Task 15p folder into your Task 15q folder. Open the webpage in your text editor and in your web browser. Edit the markup for the last two hyperlinks to include target windows like this.



```
<p>There are other places that can be used to gain valuable
information that may help. These include the <a
href="http://www.cie.org.uk" target="_cie">CIE website</a> and the <a
href="http://www.w3.org" target="_self">W3C website</a>.</p>
<p>Back to the <a href="#top">top</a></p>
```

Save your website and test the hyperlinks to make sure that they work as you expected.

## Using a hyperlink to send an email message

Hyperlinks from webpages, other applications packages or documents can be used to open an email editor and prepare a message to be sent to another person or company. This is very useful in a website where you can set up your email address and subject line within the markup and instruct the browser to open the email editor and insert these details into a new message when the hyperlink is selected.

The format for this is very similar to the hyperlinks shown earlier in this section. In place of the URL or path of a webpage that is placed within the hyperlink reference of the anchor, the **mailto:** instruction is used. This is followed by the email address of the recipient. To include the subject line for the message, this is included by specifying **subject=** followed by the text for the subject line. All the hyperlink reference is enclosed within speech marks.

### Task 15r

Create a new webpage that contains a hyperlink to prepare an email message to be sent to graham.a.brown@hotmail.co.uk with the subject line 'IGCSE Book'.

For this task you need to prepare a new markup in your text editor that contains this line.

```
<p><a href="mailto:graham.a.brown@hotmail.co.uk?subject=IGCSE%20Book">
Click here to contact us page</a></p>
```

#### Hint

Body text could also be added by adding  
&body=The%20message%20here  
to the markup.

Save this in your Task 15r folder and try it in your browser. When you click on the hyperlink it will open your email editor, place the address in the **To:** section and the text 'IGCSE Book' in the **Subject:** line. Note how the space in the text 'IGCSE Book' has been replaced in the markup with '%20'. This is the hex value for the **ascii** character 32, which in the **ascii** code represents a space. There are no spaces inside the speech marks for the hyperlink reference.

## 15.9 Using tables

### Hint

In the practical examinations, this planning stage will often be given to you in the question.

Tables are used to create the basic structure of many webpages. They are used to organise page layout and are often used in webpages even though they may not be visible. If you need to create a table within a webpage, it is always worth planning it on paper before starting to create the markup.

### Task 15s

Create a new webpage that looks like this and has the caption 'Colours':

Red	36%
Green	23%
Blue	41%

### Basic table structure

### Hint

In the practical examinations it will be much easier to use WYSIWYG software to create your tables. This section is designed to ensure that you understand how to create and edit tables. You will need to understand the markup used to define tables, even if you decide to use a WYSIWYG package to develop your tables.

Tables in HTML always start with a `<table>` tag and end with `</table>`. Start by adding these tags in the body section of the markup like this. Everything between these tags will be included in the table, except for the caption. This is added using the `<caption>` and `</caption>` tags and allows you to display a caption (usually centre aligned) above the table. If a caption is used it must be the first html tag after the `<table>` tag.

Each table is split into rows. For this task, the table you need to create has three table rows. The tag for a table row is `<tr>`. Create the three blank rows between the caption and the end of the table like this.

Each table row will contain two cells of table data. Between each `<tr>` and `</tr>` tag place start table data `<td>` and end table data `</td>` tags like this. A table cell can contain text, images, other tables, lists, paragraphs, forms, horizontal rules, etc.

```
<html>
<!-- Task 15s by your name -->
<head>
  <title>Task 15s</title>
</head>
<body>
  <table>
</table>
</body>
</html>
```

```
<body>
  <table>
    <caption>Colours</caption>
  </table>
</body>
</html>
```

```
<body>
  <table>
    <caption>Colours</caption>
    <tr>
    </tr>
    <tr>
    </tr>
    <tr>
    </tr>
  </table>
</body>
```

```
<body>
  <table>
    <caption>Colours</caption>
    <tr>
      <td>
      </td>
      <td>
      </td>
    </tr>
    <tr>
      <td>
      </td>
      <td>
      </td>
    </tr>
    <tr>
      <td>
      </td>
      <td>
      </td>
    </tr>
  </table>
</body>
```

### Hint

It is sometimes quicker to create one complete table row first with the table data cells included and copy this row a number of times using copy and paste.

The data can now be added to each cell like this.

Your table will look similar to this.

Colours

Red 36%

Green 23%

Blue 41%

```
<body>
<table>
  <caption>Colours</caption>
  <tr>
    <td>Red
  </td>
    <td>36%
  </td>
  </tr>
  <tr>
    <td>Green
  </td>
    <td>23%
  </td>
  </tr>
  <tr>
    <td>Blue
  </td>
    <td>41%
  </td>
  </tr>
</table>
</body>
```

## Table borders

This table has been created but does not have a visible border. To show the table gridlines you must add a border. This is added as an attribute within the table tag which should be changed like this.

```
<body>
<table border="1">
  <caption>Colours</caption>
```

Setting the border to 1 sets a 1 point border width on the table like this.

Setting the border to 6 points looks like this.

Setting the border to 0 will hide the table border, yet allow the table to control the structure of the page.

Colours

Red	36%
Green	23%
Blue	41%

Colours

Red	36%
Green	23%
Blue	41%

## Headers and footers in tables

Tables can have three sections: a header, a body section and a footer. These are defined using the `<thead>`, `<tbody>` and `<tfoot>` tags, and closed with `</thead>`, `</tbody>` and `</tfoot>` respectively.

### Task 15t

Create a new webpage that looks like this and has the caption 'Fruit sales'. The colour codes you will need are #32879B for the header, #92CDDC for the footer and #B6DDE8 for the table body.

Fruit	Price
Apple	\$1230
Orange	\$780
Pear	\$240
Banana	\$4235
Lemon	\$75
Total	\$6560



To create this webpage you need to first create the open table and close table tags within the body section of the markup. Place the caption tag between these in the same way that did when you completed Task 15s. The initial markup for this section of the markup should look like this.

```
<body>
  <table border="1">
    <caption>Fruit sales</caption>
  </table>
</body>
```

Before continuing with the markup it is worth planning the table using a hand-drawn sketch similar to this. This will help you work out the structure needed for the markup. For this table, you will need three sections to the table.

	Caption	
Table Header	Fruit	Price
	Apple	\$1230
Table Body	Orange	\$780
	Pear	\$240
	Banana	\$4235
	Lemon	\$75
Table Footer	Total	\$6560

1 table row with 2 table header cells.

5 table rows, each with 2 cells of table data.

4 table rows with 2 cells of table data.

These three sections need creating next within the markup. The header section is created using the table head tags, with `<thead>` to start the section and `</thead>` to finish the section. The footer section uses the tags `<tfoot>` and `</tfoot>` and the body is defined with `<tbody>` and `</tbody>`. In HTML you must define the table header, footer and then body (in that order) if all three sections are to be included. Create the three sections within the table of your markup like this.

```
<body>
  <table border="1">
    <caption>Fruit sales</caption>
    <thead>
    </thead>
    <tfoot>
    </tfoot>
    <tbody>
    </tbody>
  </table>
</body>
```

Within each section add the correct number of table rows, using the notes you made on your sketch to help you.

You can add the table data sections to the footer and body of the table using the tags `<td>` and `</td>`. Do not use these tags in the table header. At each stage, save your webpage and check that the markup that you have written gives you the results that you expected.

In the table header, create heading cells (which are bold and centre aligned) using the tags `<th>` and `</th>` rather than the table data tags. These will set the column headings in heading style. Heading cells can be used inside the table body and table footer sections and are useful in the left column of a table if row headings are required.

Place the contents (in this case text) of the header section in the header cells and place the contents of the body and footer sections in the relevant cells. The finished markup and resulting table should look like this.

Fruit	Price
Apple	\$1230
Orange	\$780
Pear	\$240
Banana	\$4235
Lemon	\$75
Total	\$6560

### Table styles using a stylesheet

You have created the table, but it does not yet look like the table shown in Task 15t. To format the sections of the header you will attach a stylesheet and add the formatting within the stylesheet. Add the stylesheet link to the head section of the markup like this.

```
<head>
  <title>Task 15t</title>
  <link rel="stylesheet"
        type="text/css"
        href="mystyle5.css">
</head>
```

You will now create a new stylesheet called MYSTYLE5.CSS. This stylesheet will have the style definitions for the whole table as well as the header, footer and body sections. As you are going to define some of the **table** attributes in the stylesheet it will be sensible to move the table border details into the stylesheet. Remove the **border="1"** attribute from the table tag in the markup. In your stylesheet, set the table attributes so that the **border-color** is black, the **border-style** is a solid line and the **border-width** is set to 1 pixel.

```
table {border-color: #000000; border-style: solid; border-width: 1px}
thead {background-color: #32879B}
tfoot {background-color: #92CDDC; color: #FF0000}
tbody {background-color: #B6DDE8}
```

Set the **background-color** for each section of the table and the text color within the footer to red.

```
<html>
<!-- Task 15t by your name -->
<head>
  <title>Task 15t</title>
</head>
<body>
  <table border="1">
    <caption>Fruit sales</caption>
    <thead>
      <tr>
        <th>Fruit</th>
        <th>Price</th>
      </tr>
    </thead>
    <tfoot>
      <tr>
        <td>Total</td>
        <td>$6560</td>
      </tr>
    </tfoot>
    <tbody>
      <tr>
        <td>Apple</td>
        <td>$1230</td>
      </tr>
      <tr>
        <td>Orange</td>
        <td>$780</td>
      </tr>
      <tr>
        <td>Pear</td>
        <td>$240</td>
      </tr>
      <tr>
        <td>Banana</td>
        <td>$4235</td>
      </tr>
      <tr>
        <td>Lemon</td>
        <td>$75</td>
      </tr>
    </tbody>
  </table>
</body>
</html>
```

When this has been saved and is applied to the webpage the table will look like this.

## Formatting columns

The prices and heading in the right column need to be right aligned to match those in the question for the task, and the text in the left column needs to be left aligned (to override the centre align within the heading setting). You can set this in the markup for the page rather than the stylesheet. All of the cells in a column will be grouped together and have a style attribute set. In the case of the left column, this will be the alignment set to left and in the second column the alignment set to right.

These are set with tags for `<colgroup>` and `</colgroup>`. The `colgroup` tags always appear immediately after the caption but before the table header `<thead>` tag if it is used. The markup for this section looks like this. The table should then look like this.

```
<table>
  <caption>Fruit sales</caption>
  <colgroup align="left"></colgroup>
  <colgroup align="right"></colgroup>
  <thead>
```

Fruit sales

Fruit	Price
Apple	\$1230
Orange	\$780
Pear	\$240
Banana	\$4235
Lemon	\$75
Total	\$6560

Fruit sales

Fruit	Price
Apple	\$1230
Orange	\$780
Pear	\$240
Banana	\$4235
Lemon	\$75
Total	\$6560

## Formatting cells

This table still does not look exactly the same as that shown in the task. The ruled lines between the cells are not visible. To turn these on add to the table tag the **rules** attribute, with a value of 'all' to show ruled gridlines for all of the table.

Although this sets the ruled gridlines within the table, they have not appeared the same as the border. This

is beyond the scope of this book as the practical examinations are likely to require you to set the rules attribute to 'all' or 'none', although it is worth knowing that they could also be used to rule in 'rows', 'cols' or 'groups'. Try each of these settings and see how the table appears for each value.

**Cell padding** and **cell spacing** are used to improve the layout of a table. Cell padding is the amount of space between the contents of the cell (in this case text) and the cell border. In the table for Task 15t, you can see that there is no spacing around the text so the table looks crowded.

```
<body>
  <table rules="all">
    <caption>Fruit sales</caption>
```

Fruit	Price
Apple	\$1230
Orange	\$780
Pear	\$240
Banana	\$4235
Lemon	\$75
Total	\$6560

### Hint

Values for table borders, cell padding and cell spacing can be set in pixels (px) or points (pt).

By adding cell padding of 4 pixels to the table, you can make it appear like the one in the original task. To add cell padding insert this markup as a second attribute to the table tag. This has the effect of adding 4 pixels of whitespace between the text and the ruled gridlines of the cell like this.


```
<body>
<table rules="all" cellpadding="4px">
  <caption>Fruit sales</caption>
```

Fruit	Price
Apple	\$1230
Orange	\$780
Pear	\$240
Banana	\$4235
Lemon	\$75
Total	\$6560

Save both your webpage and stylesheet.

### Task 15u

Create a new webpage with a table that looks like this and has the caption 'Sales team'. Set the border to 5 points, the cell spacing to 5 points and the cell padding to 10 points.

	Expenses		
	Lee	Amir	Maxine
Travel	\$162.20	\$285.75	\$150.00
Hotel	\$240.00	\$182.40	\$322.00
Food	\$146.50	\$102.10	\$104.50

The background colour code that you will need is #548DD4. The image that you require is called TURTLE.JPG.

Plan the table using a hand-drawn sketch similar to this.

Caption				
Table Header	Image here 1 cell 2 rows deep	1 cell three columns wide		
		Lee	Amir	Maxine
Table Body	Travel	\$162.20	\$285.75	\$150
	Hotel	\$240	\$182.40	\$322
	Food	\$46.50	\$62.10	\$64.50

2 table rows with 4 columns,  
2 cells in first row merged, 3 cells  
in second row merged, 3 table heading cells.

3 table rows, each with 1 heading cell  
and 3 table data cells.

Shading shows cells with a heading format rather than  
table data format.

Create the basic markup as you did with Task 15t, starting with the table tags, the caption, the two sections of the table and then inserting the table rows. The markup so far will look like this.

The top row of the table header has only two cells. The first of these is a cell that covers two rows. For this you use a **rowspan** attribute to tell the browser this cell is going to span the two rows. The markup for this section will look like this.

```
<thead>
<tr>
<td rowspan="2">A</td>
<th colspan="3">B</th>
</tr>
```

```
<body>
<table>
<caption>Sales team</caption>
<thead>
<tr>
</tr>
</thead>
<tbody>
<tr>
</tr>
<tr>
</tr>
<tr>
</tr>
</tbody>
</table>
</body>
```

The second cell in the top row is a cell that covers three columns. For this you use the **colspan** attribute to tell the browser that this cell is going to span three columns. This cell was identified in your sketch as a being a heading cell, so the **colspan** attribute is used within the table heading tag.

Using the sketch to work from, add the cells to each row of the table. In the body of the table, set the first cell of each row as a table heading and the next three cells as table data. This section of the table will look like this.

In the table tag near the top of the markup, add the attributes for the border, rules and **cellpadding**. Also, include the **cellspacing** attribute, which increases the spacing between each cell in the table. The markup for the table tag will look like this.

```
<body>
<table border="5" rules="all"
cellpadding="10px"
cellspacing="5px">
<caption>Sales team</caption>
```

```
<th colspan="3">B</th>
</tr>
<tr>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<th>F</th>
<td>G</td>
<td>H</td>
<td>I</td>
</tr>
<tr>
<th>J</th>
<td>K</td>
<td>L</td>
<td>M</td>
</tr>
<tr>
<th>N</th>
<td>O</td>
<td>P</td>
<td>Q</td>
</tr>
</tbody>
</table>
</body>
</html>
```

### Hint

When creating a new table like this, it is wise to add a single character as contents of the cell when you create it. In this case a single letter 'A' has been added to the top left cell, the letter 'B' to the next cell and so on. This is because some browsers, including *Internet Explorer* do not display a table cell without contents. By adding these single letters it allows you to test the table as you are creating it.

The background colour cannot be added to the table tag so create a new stylesheet called MYSTYLE6.CSS and include the style definition like this. Save this stylesheet and attach this to your HTML markup.

```
table {background-color: #548DD4}
```

Enter all the text and currency values into the correct cells in the table. The webpage should look like this. This task is continued in the next section.

## 15.10 Using images

Images are frequently used on webpages, sometimes as a picture and sometimes in the form of icons that can be used for hyperlinks.

Sales team

A	Expenses		
	Lee	Amir	Maxine
Travel	\$162.20	\$285.75	\$150.00
Hotel	\$240.00	\$182.40	\$322.00
Food	\$146.50	\$102.10	\$104.50

### Inserting an image

To complete the webpage for Task 15u, you need to replace the letter 'A' in the top left cell of the table with the image TURTLE.JPG. To do this you have to tell the web browser the name of the **image source**, which should be stored in the same folder as your webpage. Make sure that you have copied the file TURTLE.JPG into your Task 15u folder. Add the following to the markup. As some browsers do not support graphics, you can tell the browser to replace the image with alternative text. This usually describes the image so that the user can still understand what is being shown, even though they cannot see the image. The markup will look like this.

```
<thead>
<tr>
  <td rowspan="2"></td>
  <th colspan="3">Expenses</th>
</tr>
```

### Where to store an image

Images must be stored in the same folder as the webpage. This is called the current folder. Notice in the markup shown above how the filename TURTLE.JPG is given as the image source. This does not contain any reference to which folder the image is stored. Because there is no absolute reference to a folder, the browser automatically looks in the current folder for the image. This means that if this webpage is opened on another computer, as long as the image is stored in the same folder as the webpage it will work properly. If an absolute reference had been used for a file, for example:

```
</td>
```

this would prevent the file being found unless the folders in all the computers were structured in this way. If the file TURTLE.JPG is not in the current folder, the webpage will look like this. The image has been replaced by the text 'Company Logo' to tell the user what the missing image should be.

Sales team

Company Logo	Expenses		
	Lee	Amir	Maxine
Travel	\$162.20	\$285.75	\$150.00
Hotel	\$240.00	\$182.40	\$322.00
Food	\$146.50	\$102.10	\$104.50

**Hint**


A common mistake made by candidates in the practical examinations is to use absolute pathways for files, like images, stylesheets, etc.

If the image file is stored in the current folder, this will be displayed.

**Placing an image**

Images are usually placed within tables. How an object (often an image or text) is viewed within a table cell will depend upon the alignment of the cells. The horizontal alignment has been covered earlier in the chapter using the **align** attribute, which can be applied to columns (as seen earlier), rows (to format all cells in that row), or individual cells in the table heading or table data tags.

Sales team

	Expenses		
	Lee	Amir	Maxine
Travel	\$162.20	\$285.75	\$150.00
Hotel	\$240.00	\$182.40	\$322.00
Food	\$146.50	\$102.10	\$104.50

**Task 15v**

Open the WEBPAGE7.HTM. In the top row, align the images in the second column to the top left of the cell, the third column to be centre aligned both vertically and horizontally, and the last column to be placed in the bottom right corner of the cell.

**Hint**

The attributes to align elements within the table can be applied to the tags for a table, columns, rows, table headings and table data.

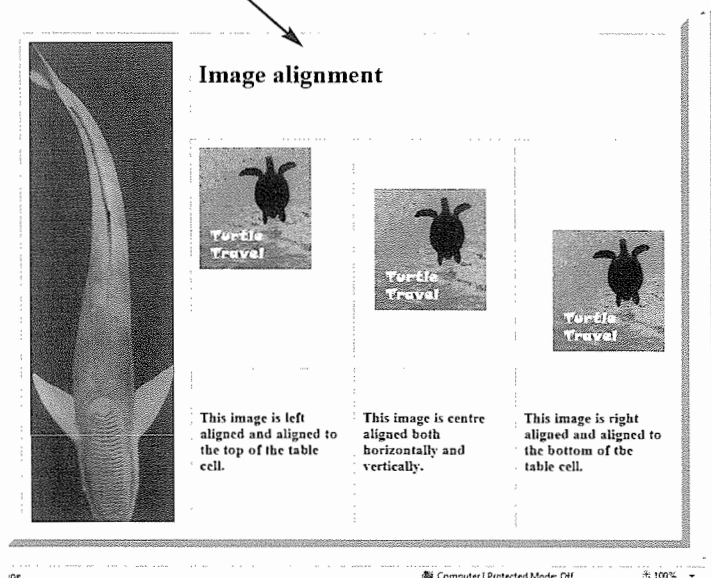
Copy the files WEBPAGE7.HTM, TURTLE.JPG and REMORA.JPG into your Task 15v folder. View the webpage in your browser.

You will edit the markup in the table data tags for the three images of a turtle in WEBPAGE7.HTM, adding new attributes to these tags to change the alignment in these cells. To align the image (or any other object) to the top of a cell of table data, use the valign attribute with the value set to top.

You can use the values of 'middle' or 'bottom' for this —→ `<td valign="top">` attribute to obtain these positions within the cell. The horizontal alignment is set using the **align** attribute, as seen in Task 15u.

For this task, apply the vertical alignment attributes to the table data tag as you did in Task 15t. Save the completed markup, which should look like that shown on the next page.

The finished webpage will look like this.



```
<html>
<!-- Task 15v by your name -->
<head>
  <title>Task 15v</title>
</head>
<body>
  <table width = "100%" border="10px" rules="all" cellpadding="10px"
  cellspacing="10px">
    <tbody>
      <tr>
        <td rowspan="3"></td>
        <td colspan="3"><h1>Image alignment</h1></td>
      </tr>
      <tr>
        <td valign="top" align="left"></td>
        <td valign="middle" align="center"></td>
        <td valign="bottom" align="right"></td>
      </tr>
      <tr>
        <td><h3>This image is left aligned and aligned to the top of the
table cell.</h3></td>
        <td><h3>This image is centre aligned both horizontally and
vertically.</h3></td>
        <td><h3>This image is right aligned and aligned to the bottom of
the table cell.</h3></td>
      </tr>
    </tbody>
  </table>
</body>
</html>
```

## Resizing an image

Images can be resized using two methods:

- The first method is to change the size of the displayed image in the markup. This is the easier of the two methods, but often uses large image files, which are slower to upload and can delay the display of a completed webpage.
- The second method is to physically resize the image in a graphics package and then save the new image. This method has the advantage of being able to reduce the file size of an image so that a webpage will be displayed more quickly. It has the disadvantage of using low resolution images, which can appear pixelated, particularly if you wish to enlarge them.

### Task 15w

Open the webpage that you saved in Task 15v. Resize the image REMORA.JPG to a width of 80 pixels and maintain the aspect ratio. Use both methods to resize this image and compare the relative file sizes of the two images. Save both versions of your webpage. Make this image a hyperlink to the webpage REMORA.HTM.



## Resizing an image in the markup

Copy the webpage and supporting files from Task 15v into your Task 15w folder. Also copy the file REMORA.HTM into your Task 15w folder.

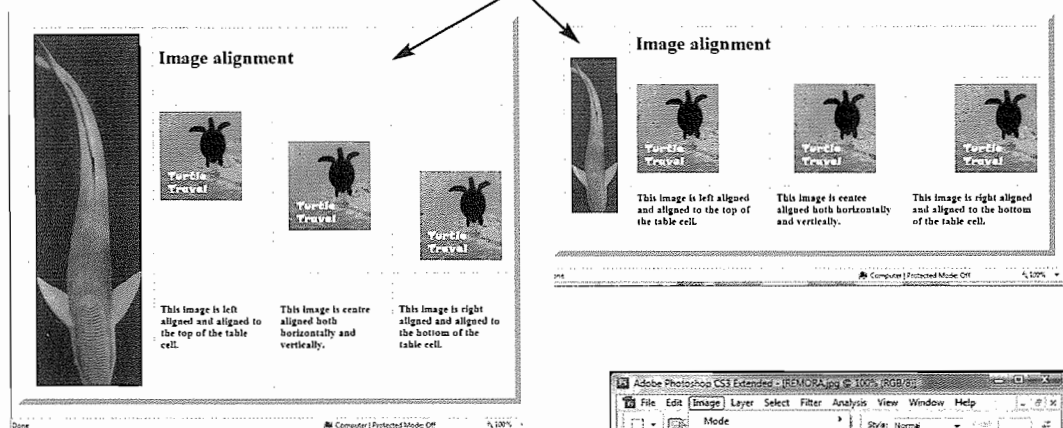
To change the size of an image in the markup use either the **width** or **height** attributes within the image tag. For this question the **width** needs setting to 80 pixels. If you change the width of the image to 80 pixels and do not specify a height for the image, it will maintain its **aspect ratio**. This means that it will keep the same proportions. Sometimes you may be asked to distort an image to give a different effect within a webpage. This is done by specifying both **width** and **height** but not keeping the aspect ratio of the original image. Find the markup for the image REMORA.JPG which looks like this.

```
<tr>
  <td rowspan="3"></td>
  <td colspan="3"><h1>Image alignment</h1></td>
```

Add a new attribute to the image tag to specify the new width of the image, like this.

```
<tr>
  <td rowspan="3"></td>
  <td colspan="3"><h1>Image alignment</h1></td>
```

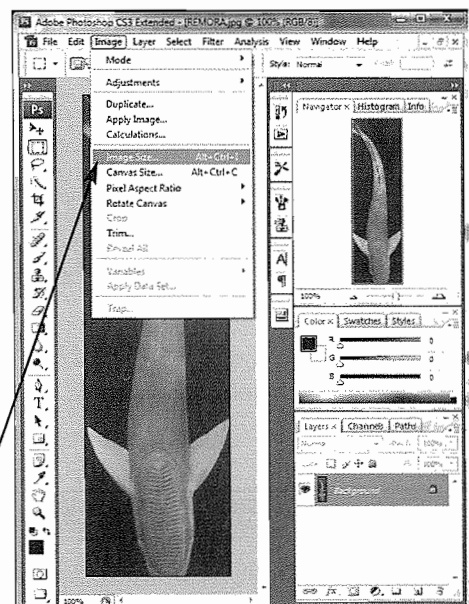
The webpage will change from this to this.



Although the vertical alignment of all three turtle images has not been changed in the markup, the effect is to make the images appear to have the same vertical alignment. This is because the row height has been reduced to fit with the new row height for the image of the remora.

## Resizing an image in an external package

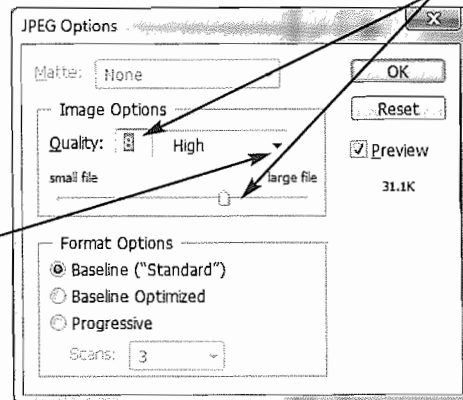
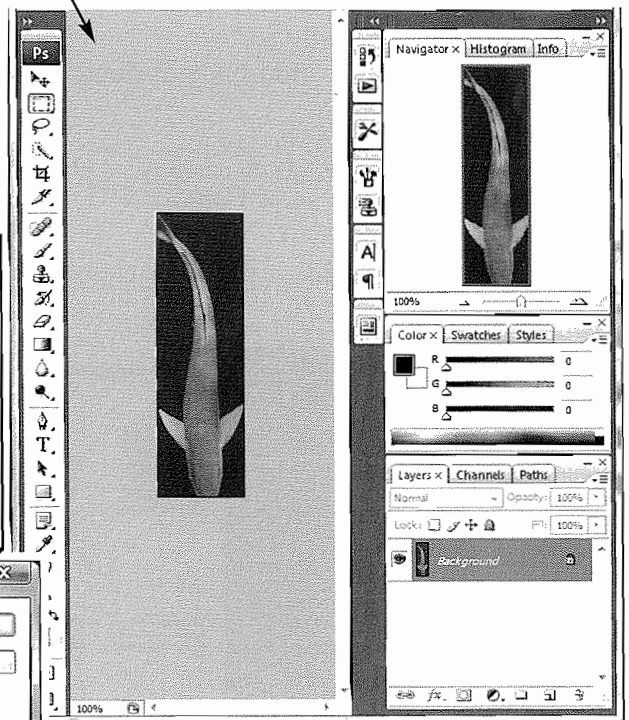
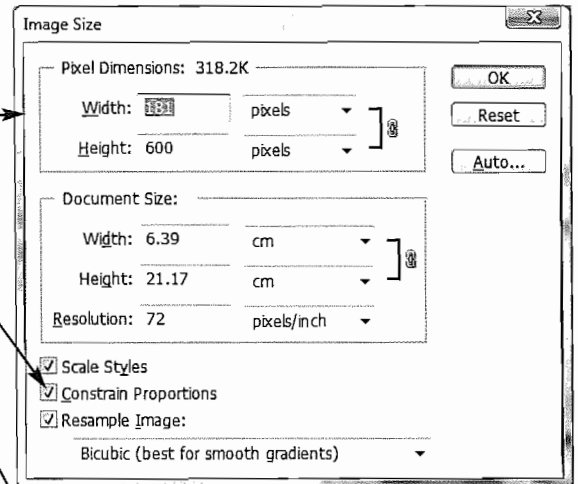
Open the image REMORA.JPG in your graphics manipulation package. In *Adobe Photoshop* images are resized using the **Image** menu, followed by the **Image Size...** option.



This opens the **Image Size** window. To set the image width to 80 pixels, change the value in the **Width:** box.

The image will maintain its aspect ratio as long as there is a tick in the **Constrain Proportions** box. To intentionally distort an image you would remove this tick and enter a height as well as a width for the image. Click on **OK**. This will alter the size of the image within the package like this.

To save the new image, select **File**, then **Save As...** and enter the new filename before clicking on **Save**. As this image will be saved in **JPEG** format, you are given options on the image quality that you require. These can be selected by typing a number between 1 and 12, using the slide bar, or selecting from the drop-down menu. 1 is the smallest file size that you can have, also gives the poorest quality images. 12 is the highest quality but results in large file sizes, which are much slower to download over the internet.



## Resampling an image

This process of changing the image quality is called resampling. Images can be downsampled, meaning fewer pixels are used for the image, as you have just done by reducing the image quality. Images can also be upsampled by adding more pixels. Downsampling reduces the file size and therefore makes the webpage load more quickly. A good technique is to have a small, low resolution image (called a thumbnail) on a webpage. If the user wants to see more detail they can click on the

image and a new window will open containing a high resolution version of the same image. The webpage needs amending so that the **width** attribute is no longer present, and the **source** attribute within the image tag points to the new filename.

```
<tr>
  <td rowspan="3"></td>
  <td colspan="3"><h1>Image alignment</h1></td>
```

Save your amended webpage with a new filename. Now open the **Documents** window and navigate to the Task 15w folder. This folder contains the files saved during this task and shows you the difference in file sizes between the two methods. Your image sizes may vary from this, depending upon the resolution you selected when you saved the file. As can be seen here, in this case the new image should load in less than 60 per cent of the time the original will take.

Name	Date modified	Type	Size
Remora	29/01/2009 18:56	HTML Document	1 KB
Remora	26/01/2009 21:49	JPEG Image	29 KB
Remora1	28/01/2009 20:53	JPEG Image	17 KB
Task 15w	28/01/2009 19:58	HTML Document	1 KB
Task 15w_version_a	28/01/2009 20:19	HTML Document	1 KB
Task 15w_version_b	23/03/2009 17:46	HTML Document	1 KB
Turtle	25/01/2009 18:02	JPEG Image	33 KB
Webpage7	27/01/2009 20:47	HTML Document	1 KB

## Hyperlinks from images

Images can be used as hyperlinks in the same way as text. To create a hyperlink to the webpage REMORA.HTM, add this hyperlink reference to an anchor surrounding the image tab.

```
<tr>
  <td rowspan="3">
    <a href="REMORA.HTM"></a></td>
  <td colspan="3"><h1>Image alignment</h1></td>
```

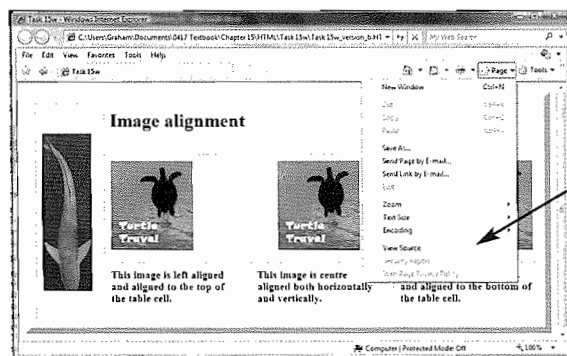
This hyperlink will open the partially constructed webpage called REMORA.HTM.

## File types for images

There are three common file types for images used in websites. These are **JPEG** files, **GIF** files or **PNG** files. You can use a graphics package like *Adobe Photoshop* to change images from one format to another by opening them and using **Save As...** to change the file format for the new image.

## Printing webpages

You will be required to print different views of your webpages for the practical examinations. You must ensure that your name is included on the webpage before it is sent to the printer, in whichever view is specified. Printing the HTML view is frequently required, and even if you are using a WYSIWYG package you will need to open the webpage in a text editor to print the html. Browsers will often do this for you. In *Microsoft Internet Explorer* this is opened using **Page and View Source**.



It is worth noting that the image above would not gain any credit in the practical examinations as there is nothing to identify the candidate on the printout. Browser views like this are acceptable, but you must ensure that, if you choose to use a WYSIWYG package, you test the webpage in a browser and not just within the package. Some products will display what appears to be the browser view, but is only a development tool and does not necessarily display the page as it should. Taking screenshots of your pages; using the <Print Screen> button on your keyboard to copy the screen contents into the clipboard, then pasting the clipboard into another package (usually a word processor) is a useful method of providing evidence of your work. If you have used stylesheets in your webpage make sure that you print evidence of these as well. It is more difficult to include your name in a stylesheet, so copying and pasting the stylesheet into a word-processed document containing your details is a good method of producing this evidence.

### Activity 15f

Create a new webpage with a table that looks like this and has the caption 'Last week'. Set the border, cell spacing and cell padding to 4 pixels.

PTC Travel	Expenses			
	Anne	Dan	Lisa	Udoka
<b>Petrol</b>	\$182.20	\$185.75	\$260.00	\$322.00
<b>Food</b>	\$80.00	\$62.40	\$54.00	\$40.00
<b>Hotel</b>	\$420.00	\$382.10	\$104.50	\$260.00

The background colour code that you will need is #FFFF00. The image that you require is called PCTC.JPG. Print your webpage as html and as it is viewed in your browser.

**In this chapter you will learn how to:**

- use a master slide to set up a presentation
- create presentation slides
- add and edit text
- insert an image
- create and add a chart to a slide
- insert other graphical features to a slide
- use transitions between slides
- animate objects on a slide
- save and print a presentation.

For this chapter you will need these source files from the CD:

- HTML.RTF
- POWERPOINT.RTF
- SLOGAN.JPG
- WEBSITE.JPG

## 16.1 What is a presentation?

A presentation is a series of slides used to give information to an audience. A presentation can be used in many different ways: to teach or inform as a visual aid in a lecture, or as a constant on-screen carousel giving information or advertising, for example in a shopping centre or mall. The media for delivery and type of presentation developed will depend upon the purpose of the presentation and the target audience. For example, you would design a presentation on road safety to a class of five-year-old children to be short (for a short attention span), have only a few simple words (as they cannot read fluently) and contain bright colourful moving images (to keep their attention). The medium for the delivery of this presentation would be using a multimedia projector and large screen.

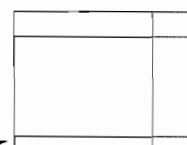
It is important to understand all of this information before starting to design and develop the presentation, as different media will require different screen/page sizes. Most presentations will require a consistent colour scheme and consistently applied styles to all slides. In the practical examination, you will be given details of these colour schemes and styles.

## 16.2 Using the master slide

### Task 16a

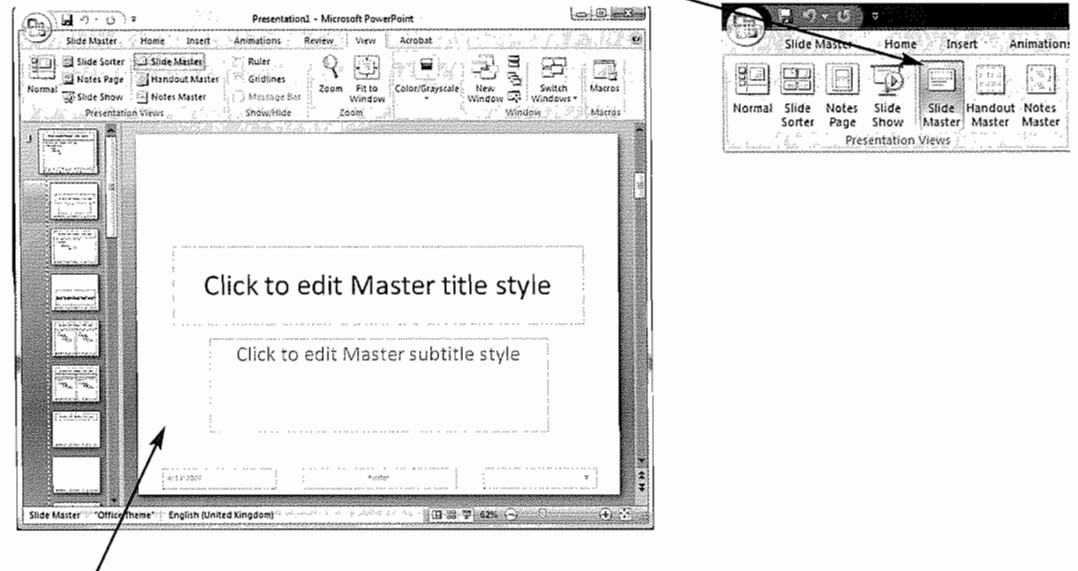
You are going to create and save a short presentation for IGCSE students telling them how to use *Microsoft PowerPoint*. The medium for delivery will be a multimedia projector.

Create a master slide with a pale yellow background on the right-hand side (about 1/4 of the width) with one vertical dark blue stripe as a border for the yellow background and two horizontal dark blue stripes. Each stripe should be 4 points wide. It should look like this.



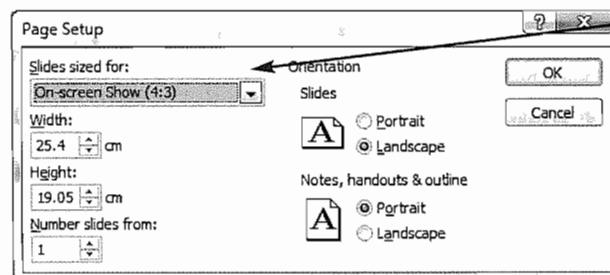
A master slide allows you to design the layout of your slides before you start adding objects (like text or images) to the slides. It holds the information on colours, fonts, effects and the positioning of objects on the slides.

Open *PowerPoint* and select the **View** tab. Find the **Presentation Views** section and click on the **Slide Master** icon.



The display will change to this. The layout of a presentation will depend on the medium for its delivery. In this task, you are told that the medium for delivery will be a multimedia projector. To change the medium for delivery you must select the Slide Master tab and find the **Page Setup** section. Click on the **Page Setup** icon, which will open the **Page Setup** window.

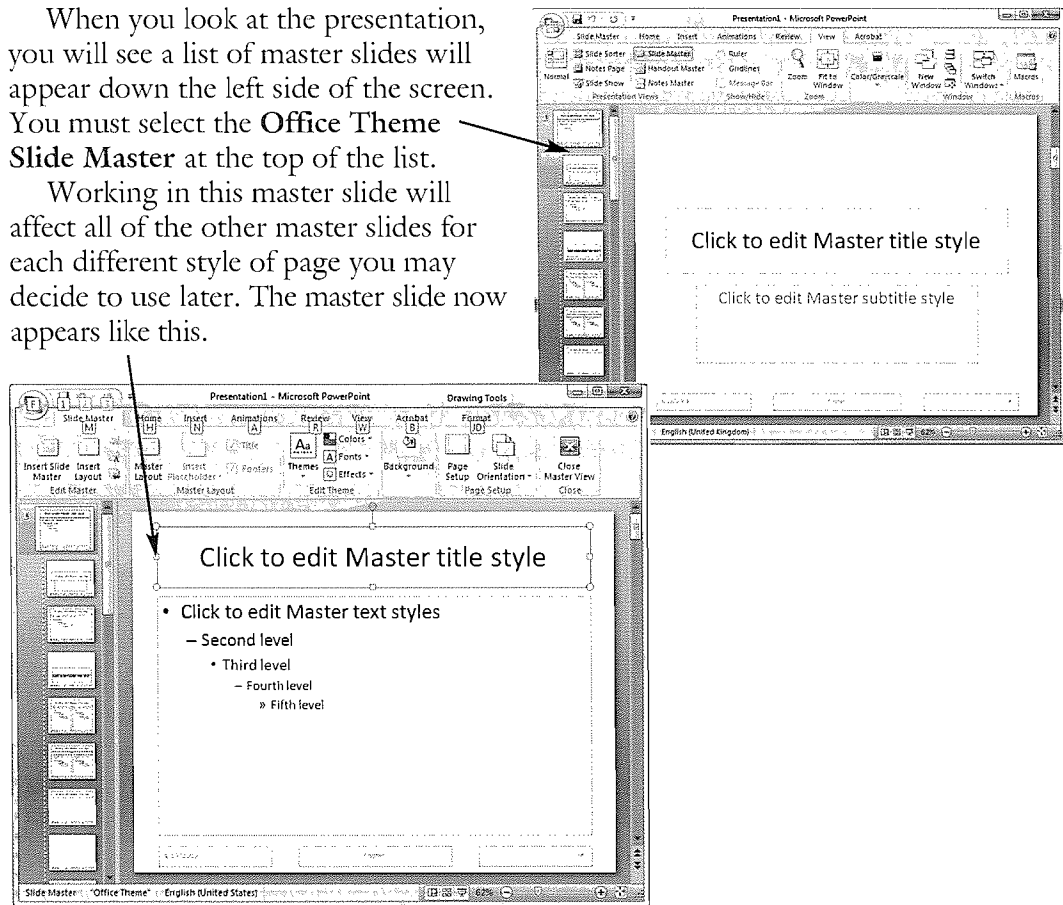
Use the **Slides sized for:** drop-down list to select an **On-Screen Show**. You can also change the orientation of slides and handouts/notes pages in this window. When you have selected the settings, click on **OK**.



Delivery of a presentation with a multimedia projector may include the use of **audience notes** and/or **presenter notes**. Audience notes are paper copies of the slides of a presentation that are given to the audience so that they can take them away and refer to them after the presentation. These can be in different formats, with several slides on a page, or just one slide with space for the person to add their own notes. Presenter notes are a single printed copy of the slides from a presentation, with prompts and/or key facts that need to be told to the audience by the person delivering the presentation. These notes are not usually given to the audience. More information will be given on these later in this chapter.

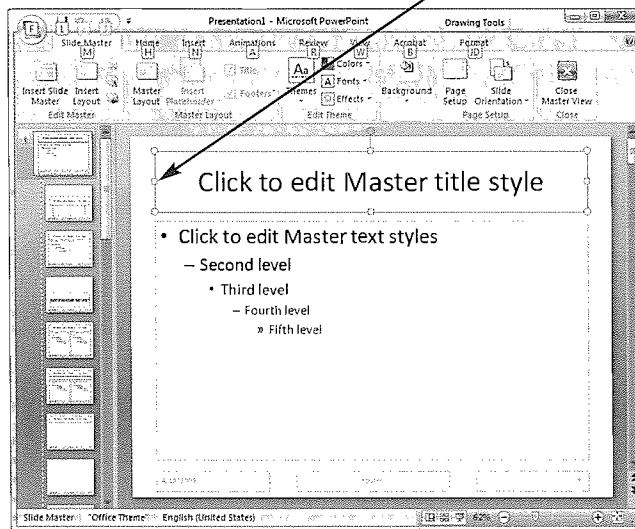
When you look at the presentation, you will see a list of master slides will appear down the left side of the screen. You must select the **Office Theme Slide Master** at the top of the list.

Working in this master slide will affect all of the other master slides for each different style of page you may decide to use later. The master slide now appears like this.

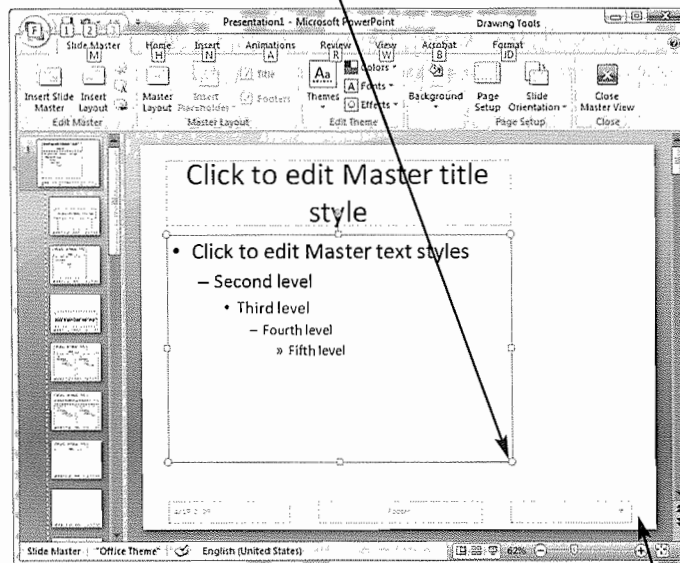


For this task, the master slide has to contain a number of lines and one filled area. You should start with the filled area. This will be created by placing a filled rectangle in the right place. However, this rectangle will cover some of the objects already on the slide, so these objects need resizing or moving out of the way first.

Select the title text box and use the drag handle to resize the text box.

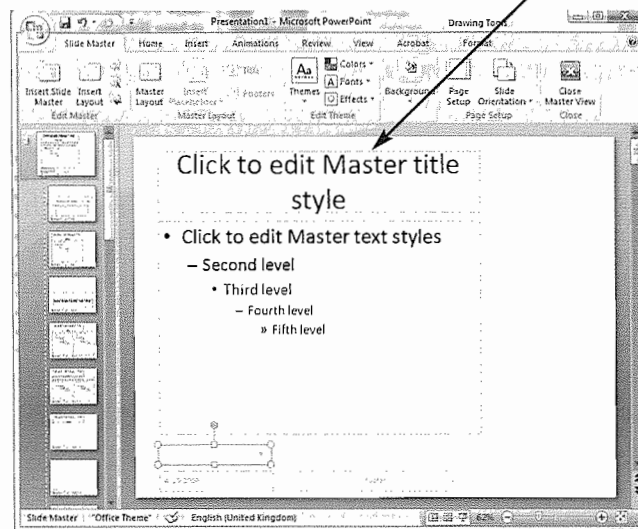


Repeat this for the body text box on the master slide. This box has also been made less deep using the lower drag handle, in order to create space to move the slide numbering.



The text box containing the slide numbering is too small to resize, so this will need to be moved from the right-hand side. Drag the entire text box into the space created below the body text box.

The page layout should now look like this.



Select the **Insert** tab and find the **Illustrations** section. Click on the **Shapes** icon and select the **Rectangle** option from the drop-down menu.

Use the drag tool to drag a new rectangle that fills about a quarter of the slide. Make sure that this rectangle fits to the top, bottom and right edges of the slide and leaves no white space.

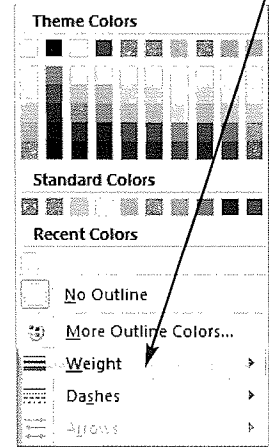
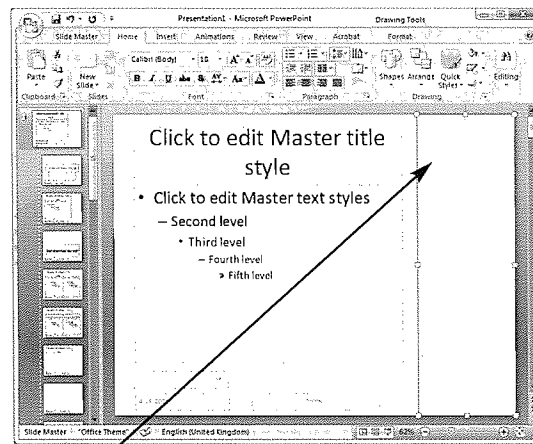
#### Hint

Many shapes like the rectangle can also be found in the **Drawing** section of the **Home** tab.



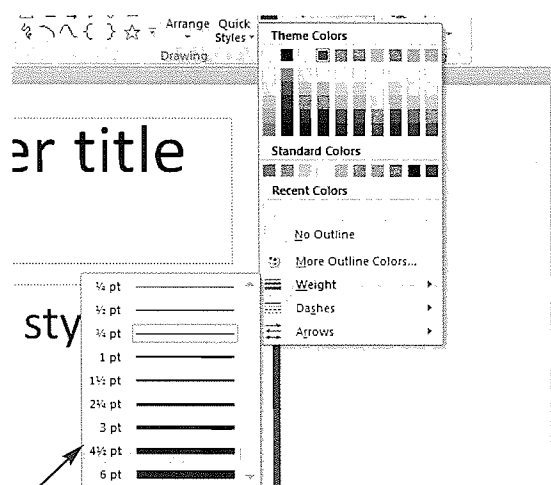


You now need to edit the appearance of the rectangle. Select the **Home** tab and find the **Drawing** section. Use the **Shape Fill** icon to select the fill colour and click on the **Shape Outline** icon, followed by **Weight** from the sub-menu. Select the **More Lines...** option to remove the border from the rectangle. This can be done by setting the width of the line to 0. The master slide should look like this.



You will notice that all the other master slides (down the left-hand side of the window) now show the yellow background.

Next you need to add the three blue lines to the slide. Select the **Home** tab, then in the **Drawing** section select the **Shapes** icon and click on the **Line** option from the drop-down menu. Use the drag tool to draw a vertical line on the border between the yellow and white areas.



#### Hint

Holding down the <Shift> key whilst placing the line forces it to be either vertical, horizontal or at 45 degrees.

Use the **Shape Outline** icon to change the line colour to dark blue. The **Shape Outline** icon can also be used to change the line thickness. Select **Weight** and from the sub-menu select the line weight. For this task, the line weight should be 4 points. This option is not available from this menu so select the nearest weight available, in this case 4½.

Click to edit Master title style

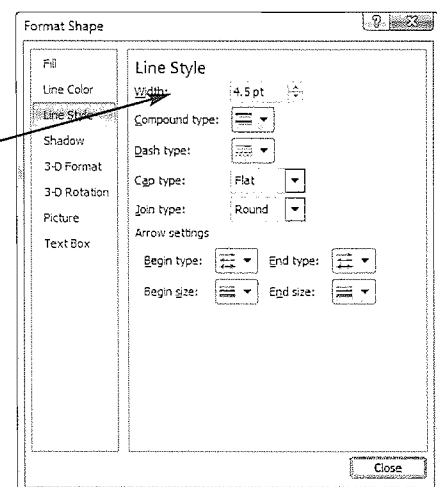
Click to edit Master title style

#### Hint

You may find it easier to copy the first line and paste it twice, rotate the two new copies and place them as required by the task.

Right mouse click on the line and select **Format Shape...** from the drop-down menu. From the **Format Shape** window adjust the line **Width:** to 4 points. Click on

Repeat this process to add the two horizontal lines to the master slide, in the positions shown in the task. Save the presentation with the filename Ch\_16\_Task\_16a.

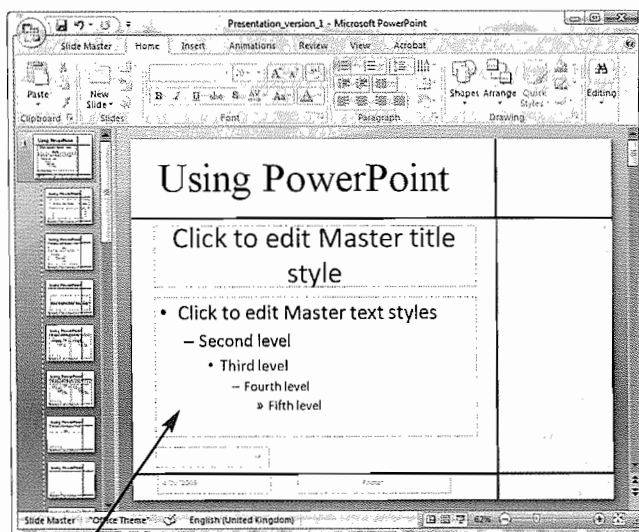


### Task 16b

Open the presentation that you saved in Task 16a. Include the heading 'Using PowerPoint', left aligned in a dark blue, 60 point serif font above the blue line at the top of the master slide. Include an automated slide number in the bottom left of the footer.

Enter your name, centre aligned in the white area, at the bottom of the master slide. Use a black, 14 point, italic, serif font.

Place a clipart image of a computer or peripheral in the right-hand area. Crop and/or resize the image so that it fits within the yellow area and will not overlay the dark blue lines. Do not distort the image. Make sure that the image fills more than 50 per cent of the available space. Save your presentation.



To include the heading, add a new text box in the top left section of the slide. This text box will replace the title text box, so move the title text box down the slide to below the blue line. Go to the **Insert** tab and click on the **Text Box** icon in the **Text** section. Drag out a new text box, select the **Home** tab and find the **Font** section. Set the font size to 60 points and select a serif font, e.g. Times New Roman.

Enter the text 'Using PowerPoint' into this text box. The window should now look like this. Highlight the text and set the font colour to dark blue, using the **Font Color** icon.

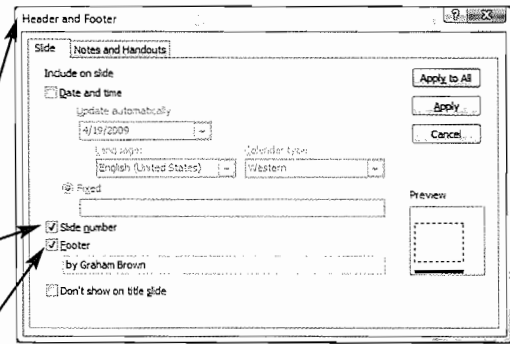
As the text is already left aligned, do not adjust the alignment. Notice how the text box has been aligned with the other objects on the slide so that the examiner can check that the text is left aligned.

The automated slide number is in the object moved from the right side of the footer. The task asks for this to be placed on the left in the footer. Resize this object (as shown previously) and change its alignment to left aligned by clicking on the **Align Text Left** icon in the **Paragraph** section under the **Home** tab. Drag the box into the bottom left corner. As the date is not required on all pages, this object can be deleted before moving the automated slide number.

Enlarge the automated footer so that it fills the width of the white space, as shown. Make sure that you enlarge the footer so that it overlaps the slide number, which will ensure that the examiner can see that the object is centre aligned. Change the text and the slide number to a black, 14 point, serif font, as described above. The finished footer area should look like this.

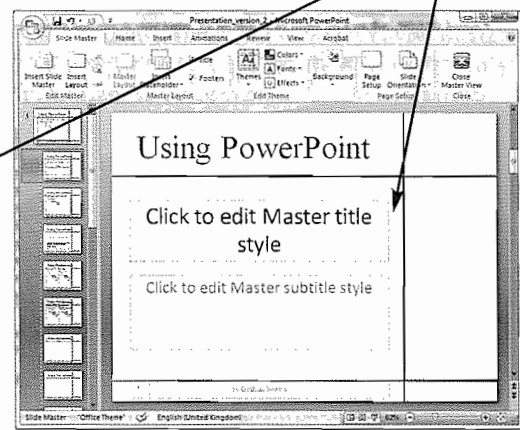
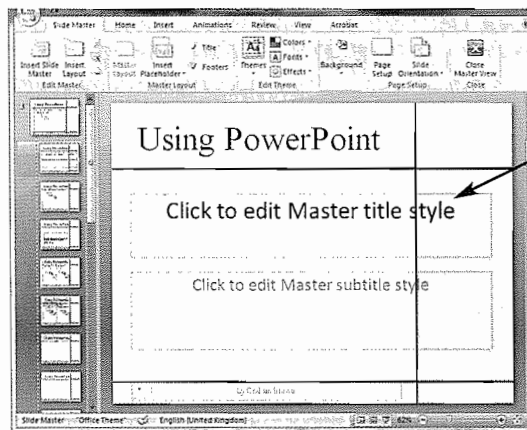


Although you have set the footer area of the master slide, you have not yet added your name to the footer, nor told *PowerPoint* to display the page numbers. To do this, select the **Insert** tab, then in the **Text** area click on the **Header and Footer** icon. This opens the **Header and Footer** window.



Tick the box for **Slide number** and the box for **Footer**. Move the cursor into the text box for **Footer** and type in your name. To set this on all slides, click on **Apply to All**.

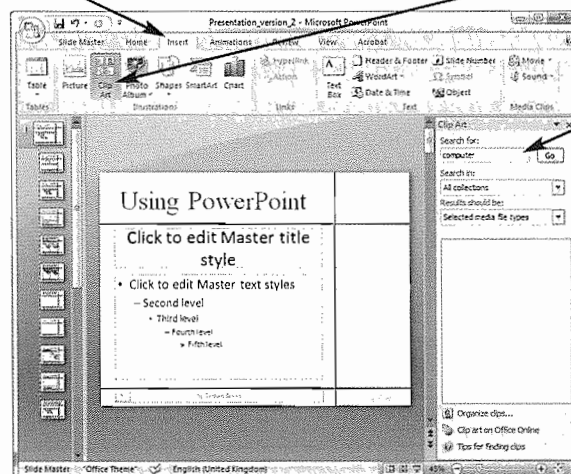
Restore the full height of the body text box on the master slide using the drag handle. Now move down into each of the other master slides and resize all text boxes to ensure that they fit within the white space, for example from this to this.



If the task required particular font styles or sizes for each of these objects, these can also be set in these master slides as described earlier.

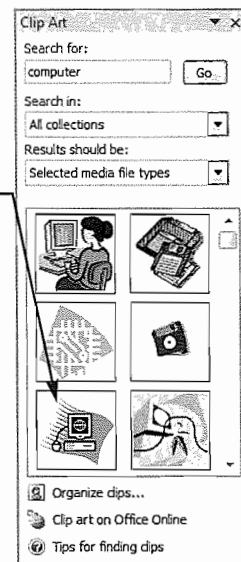
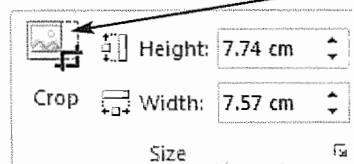
## Clipart images

To insert a clipart image, return to the **Office Theme Slide Master** and select the **Insert** tab. In the **Illustrations** section, click on the **Clip Art** icon to open the **Clip Art** pane.

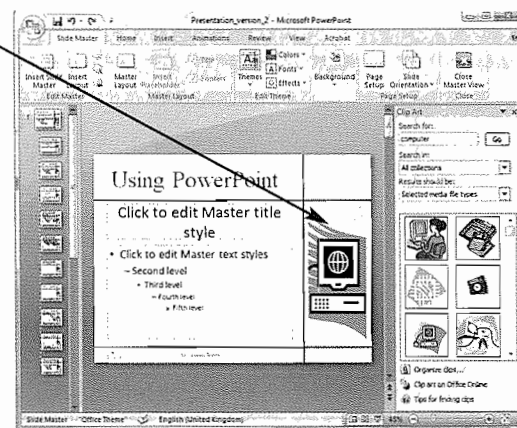
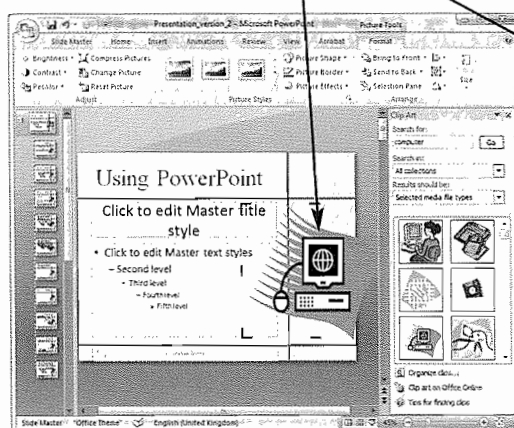


For this task you need to find an image of a computer, so enter **Computer** in the **Search for:** box and click on **Go**. (See Section 10.5 for further details on clip art options.)

This searches the clip art library and finds pictures that may match what you are searching for. Look through the images to find one that will fit well in the available space – remember that you can crop and resize the image, but cannot distort it. When you have chosen the image, click the left mouse button on it to select it. This places this clip art image onto the master slide. Move and resize it so that it fits into the correct area. To crop the image, select the image and click on the **Format** tab. In the **Size** section, click on the **Crop** icon.



With the crop tool selected use the drag handles of the image to crop the edges so that it changes from this to this.



When the master slide is complete, select the **View** tab and in the **Presentation Views** section click on the icon for **Normal** page layout. Save your presentation.

## 16.3 Creating slides

There are two methods of creating presentation slides. The first method is to import the page contents from a text file. The text file could be stored in .txt or .rtf format. The method for creating these slides is the same. With rich text format, the styles saved within the document apply to the presentation, whereas with text format there are no styles saved within the document, so these need adding after the slides have been created.

### Task 16c

Open the presentation that you saved in Task 16b. Import the file **POWERPOINT.RTF**, placing the text as slides in your presentation software. Save the presentation.

Open the presentation. Select the **Home** tab and in the **Slides** section select the drop-down menu from the **New Slide** option. Select **Slides from Outline...** near the bottom of this menu. Browse through your files until you locate the file **POWERPOINT.RTF**; click on this filename followed by **Insert**. This leaves the original title slide but adds five extra slides to the presentation. Save the presentation.

The second method used to create presentation slides is by inserting a new slide into an existing presentation.

### Task 16d

Open the presentation that you saved in Task 16c. Insert a new slide between slides 4 and 5. This slide will contain the heading 'Ease of use', a chart and a bulleted list:

- 86% of students found it easy to use
- 120 students in the sample

Use this data to create a chart: Easy – 103, Difficult – 12, No response – 5. Show the percentage of students in each category.

On slide 1, add the heading 'Hints and tips' and add the subheading 'for IGCSE students'.

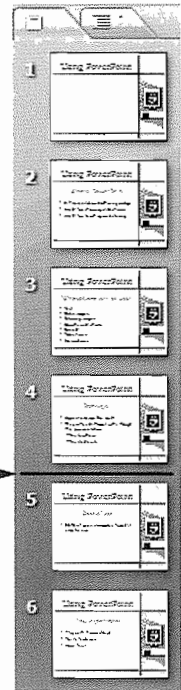
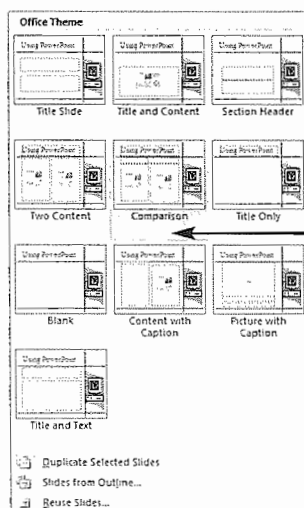
Set the following styles of text throughout the entire presentation:

- heading: dark blue, serif, left aligned, 40 point
- sub-heading: blue, sans serif, centre aligned, 30 point
- bulleted list: black, sans serif, left aligned, 24 point.

Save the presentation.

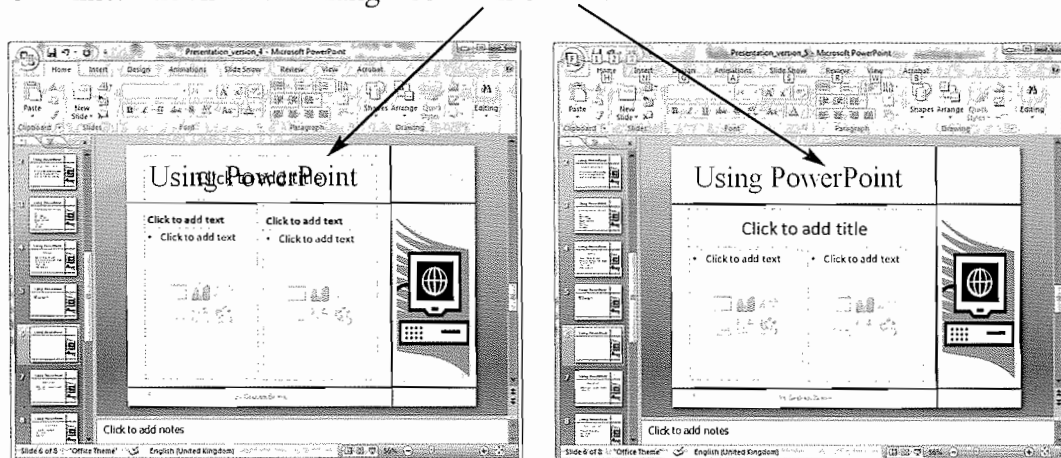
Open the presentation. Move into the left pane and select the **Slides** tab (if it is not already visible). Click the cursor between slides 4 and 5 so that it flashes as a horizontal line like this.

Select the **Home** tab and in the **Slides** section select the drop-down menu for **New Slide**. Look at the different slide layouts available from this menu and select the layout that matches the slide you are going to produce. This slide needs a small bulleted list and a chart, so the most appropriate slide type will be **Comparison**.



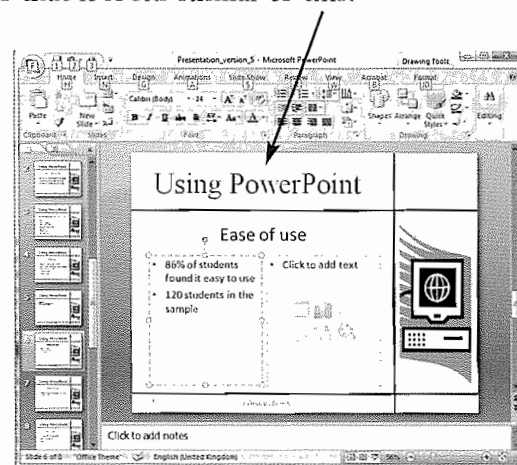
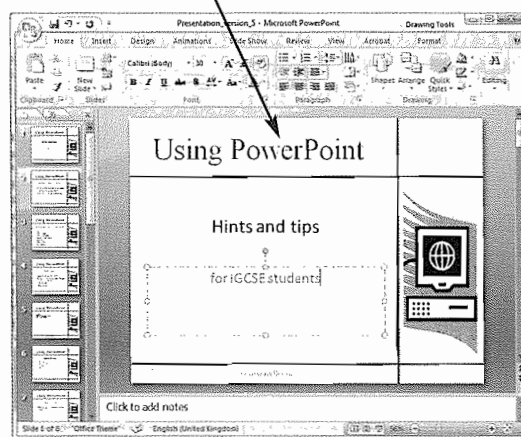
Although the option for 'Content with Caption' looks correct, it is more difficult to manipulate the caption box. Click once on this icon to get the new slide.

Delete both of the text boxes that say 'Click to add text'. These are not needed in this slide. To do this click on the line for the text box and press the < Backspace> or <Delete> key. Use the drag handles to edit the two larger objects below them to make them fit the available space. Move the title text box down, so it sits below the blue line. The slide will change from this to this.



Click in the title text box and add the heading 'Ease of use'. Select the left object below the title. Click on the bulleted text 'Click to add text'. This will change this object into a text box. Type in the text '86% of students found it easy to use', <Return>, '120 students in the sample', so that it looks similar to this.

It is sensible to complete all the text parts of this task together and then add the chart at the end. Move onto slide 1. Add the heading 'Hints and tips' in the title text box. In the subheading text box add the text 'for IGCSE students' so that slide 1 looks like this.



Select the **View** tab followed by **Slide Master** and select the **Office Theme Slide Master** (the top master slide). Highlight all the text in the heading (title) style and click the right mouse button to obtain a drop-down menu and miniature toolbar to allow you to edit the text style.

The heading style needs to be a dark blue, left aligned serif font; so select a serif font like Times New Roman, using the font list. Use the **Text Color** icon to select a dark blue colour and use the **Align Text Left** icon to change the text alignment. Use the drop-down list for the font size to change it to 40 points. The text box should now look like this.

Use a similar method to set the first level of the bulleted list, to a black sans serif, left aligned font (no changes needed for these parts), 24 points high. Adjust the font sizes for the other levels of bullet points so that they are smaller relative to this one.

The sub-heading style is not visible in this master slide, so you need to move into the master slide for the **Title Slide Layout** (the first master slide down).

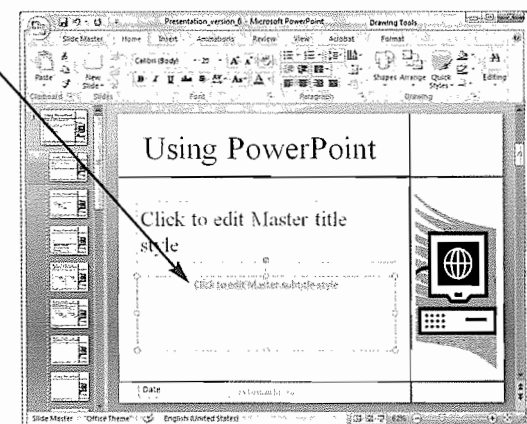
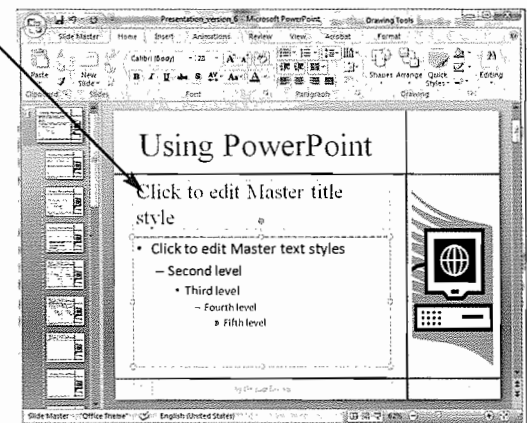
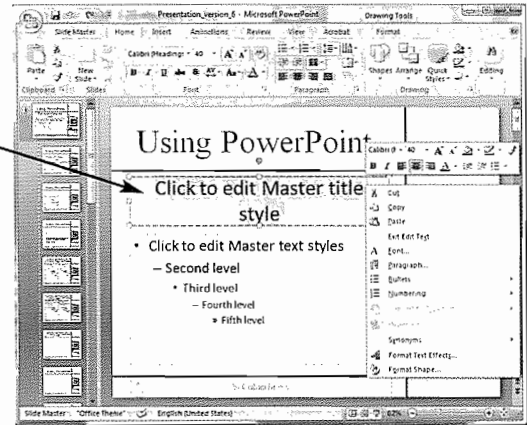
In the master slide for the **Title Slide Layout**, highlight the text for the Master subtitle style and set this to a blue, sans serif, centre aligned, 30 point font. Use the same method as you did for the Master title style.

Move through each slide master in turn and edit any of the styles on other page layouts that need to be set.

Select the **View** tab and the **Normal** icon. Check each slide carefully to ensure that the styles that you have changed have been applied to each slide of the presentation. If they have not been applied, you can right mouse click on the slide background (not on an object) and select **Reset Slide** from the drop-down menu to ensure that each slide matches the expected styles. You should not need to do this very often, but in this example, because you imported pre-defined styles into the presentation, added a new page and then set the styles, it may be necessary.

It is very important to make sure that all slides are consistent. A significant number of marks are lost in the practical examinations by students who assume that the software will format their slides correctly and do not check each slide carefully themselves.

This task is continued in the next section.



### Hint

You may find it easier to define all the styles in the master slides before adding the contents to any of the slides. The instructions given in this task (and the practical examinations) may not be in the easiest order within PowerPoint. It is sensible to read through the task before starting. For example, setting the styles first may save you a lot of time later. Remember that the practical examinations are created for all platforms and many types of software.

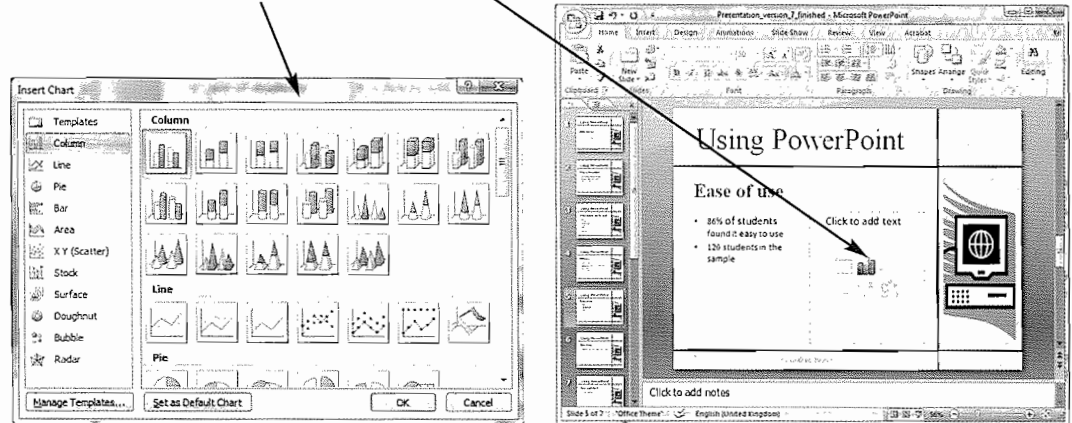


## 16.4 Creating a chart

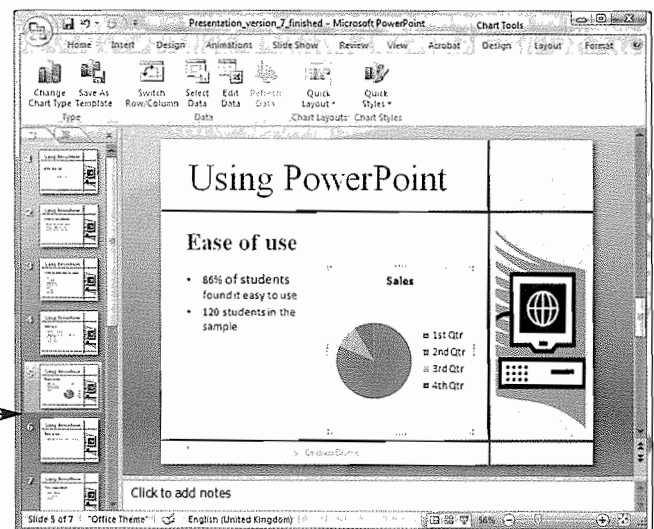
Move into slide 5. In the task you were instructed to 'use this data to create a chart: Easy – 103, Difficult – 12, No response – 5. Show the percentage of students in each category.' There are two ways of doing this: to create the chart within *PowerPoint*; or to create the chart in *Excel* and then copy and paste in onto the required slide.

### Creating a chart in PowerPoint

Click on the chart icon in the unused object on this slide. This opens the **Insert Chart** window.



You must decide which type of chart is the most appropriate for the task. In this case, you are told to show the percentage of students in each category and there is a clue to the need for percentage values in the bullet points on the left of the slide. Because the chart needs to show percentage values (parts of a whole), a pie chart is the most appropriate type of chart. Select a simple pie chart from the available chart types and click on **OK**. This opens a default pie chart, but does not use the correct data. The slide should now look like this.





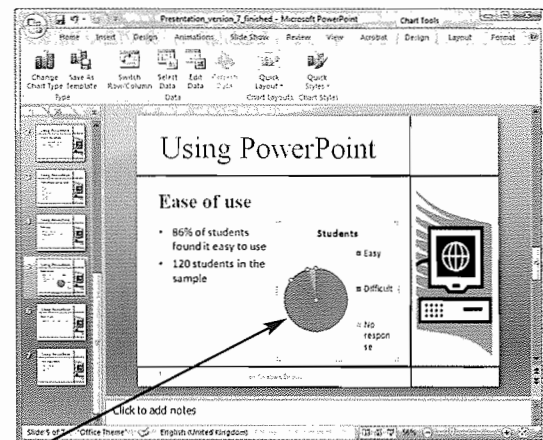
As you can see, the chart does not relate to the data for this task. Instead, it is about quarterly sales in a company. It may also open an *Excel* spreadsheet like this that contains the data. If this does not appear, select the **Design** tab under **Chart Tools**, find the **Data** section and click on the **Edit data** icon.

Move into cell B1 and replace the label 'Sales' with the word 'Students'. In cell A2, enter the text 'Easy' so that it replaces the existing text, in A3 type 'Difficult' and in A4 'No response'.

Replace the sales figures in B2 with 103, in B3 with 12 and in B4 with 5. Delete the contents of cells A5 and B5. Drag the blue range marker using the drag handle so that it includes cells A1 to B4 only. It should now look like this.

	A	B	C	D	E	F
1		Sales				
2	1st Qtr	8.2				
3	2nd Qtr	3.2				
4	3rd Qtr	1.4				
5	4th Qtr	1.2				
6						
7						
8						

	A	B	C
1		Students	
2	Easy	103	
3	Difficult	12	
4	No response	5	
5			



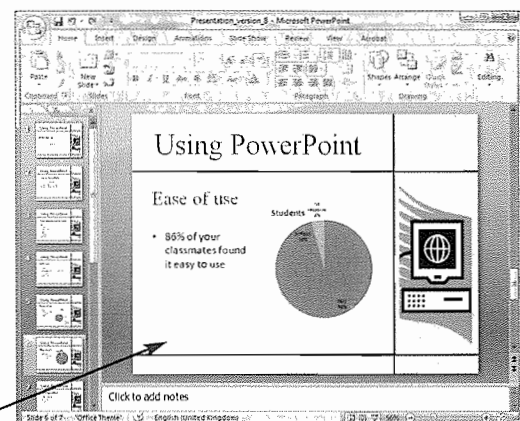
The slide now contains the correct chart. Close the spreadsheet containing the data.

## Inserting a chart into PowerPoint

The second way of placing a chart into the slide is to create a chart in *Excel* and then insert this chart into the slide. This method is usually more flexible than the first method, as it allows you to create and edit the chart before adding it to the slide. Open *Excel* and enter the data into cells A1 to B3.

	A	B
1	Easy	103
2	Difficult	12
3	No response	5

Select the **Insert** tab, and in the **Charts** section click on **Pie Chart**. Manipulate and label the chart as shown in Section 14.8. Copy the chart and paste it into the slide. For this task you can paste it into slide 6. Resize both the chart and the text containing the bullet point so that they do not overlap. The completed slide will look like this.

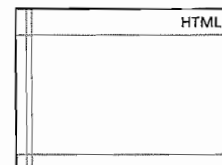


### Hint

Charts may be created from contiguous or non-contiguous data and can have features like titles, legends, and labels for axes and segments. All the features that you studied in Chapter 14 can be applied to a graph or chart before it is cut and pasted into the slide.

### Activity 16a

You are going to create a short presentation for IGCSE students giving them hints on website authoring. The medium for delivery will be a multimedia projector. Create a master slide with a green background at the top (about  $\frac{1}{6}$  of the height) and at the bottom of each slide (about  $\frac{1}{6}$  of the height) with a dark green horizontal line as a border between the white and green backgrounds. Add two vertical dark green lines to the left of the slide. Each line should be six points wide. It should look like this. Include the heading 'HTML', right aligned in a black 40 point sans serif font at the top of the master slide (as shown above). Include an automated slide number in the green area to the left of the two vertical lines. Make this a 14 point black sans serif font. Include your name right aligned in the footer in the same style as the page numbering. Set the following styles of text throughout the entire presentation:



- heading: black, sans serif, left aligned, 40 point, within the green 'header' section
- subheading: red, serif, centre aligned, 40 point
- bulleted list: dark green, serif, left aligned, 32 point
- level 2 bulleted list: dark green, serif, left aligned, 24 point.

Place a very small clipart image of a computer or peripheral in the bottom right corner of the white space. Crop and/or resize the image so that it fits. Do not distort the image. Import the file HTML.RTF, placing the text as slides in your presentation software. On slide 1, add the heading 'Hints and tips' and add the subheading 'for IGCSE and Level 2 students'. Use this data to create a chart: Text editor – 42, FrontPage – 37, Dreamweaver – 31. Show the percentage of students in each category. Insert this chart into slide 5 with the heading 'Percentage of users from the survey'.

## 16.5 Adding presenter notes

### Task 16e

Open the presentation that you saved in Task 16d. Add the following presenter notes to the slides:

**Slide 1:** Welcome to this presentation giving you useful hints and tips on using *Microsoft PowerPoint* for your IGCSE practical examinations.

**Slide 2:** The presentation that you are watching is made using *PowerPoint*.

**Slide 4:** Hyperlinks can be used to give different paths or to open external websites or documents.

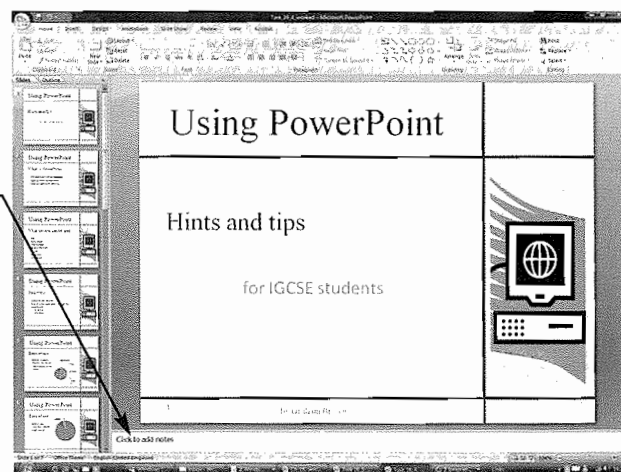
**Slide 5:** Graphs and charts can be added to enhance a presentation.

### Hint

Take great care when entering presenter notes. A large number of marks are lost in the practical examinations each year through careless data entry in presenter notes. Take great care with the use of capital letters and punctuation.

Open the presentation that you saved in Task 16d. As you open the presentation in **Normal** view, it looks like this.

Move the cursor to the **Notes** area of the screen. Click the cursor into this box and type the presenter notes for slide 1. Use the **Slides** tab to select the next slide and continue with this process until all of the presenter notes have been entered. Not all of the slides have presenter notes. These notes will not appear on the slides when the presentation is run. You will learn how to print these so that the presenter can read from them in Section 16.9. Save the presentation.



## 16.6 Using images

### Task 16f

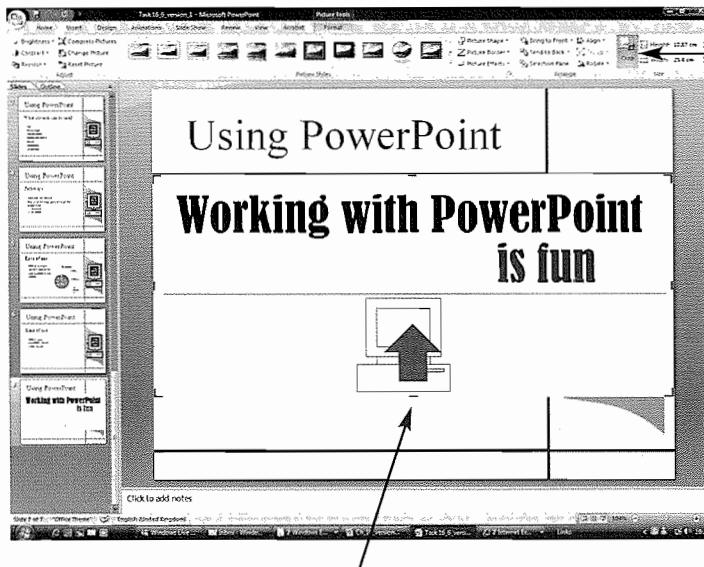
Open the presentation that you saved in Task 16e. Add the image SLOGAN.JPG to the bottom of the final slide, above the blue line. Crop the image so that the red line and all contents below it are removed. Resize the image so that it fits about 1 centimetre from the left edge of the slide, 1 centimetre above the lower blue line and 1 centimetre to the left of the vertical blue line, maintaining its aspect ratio. Adjust the brightness and contrast of the image so that the background colour (pale yellow) is not visible.

In Task 16b, you inserted a new image from clip art into the master slide. For this task, you are going to insert an image given to you as a file.

Open the presentation saved in Task 16e and use the **Slides** tab to open slide 7. Select the **Insert** tab and then click on the **Picture** icon. This opens the **Insert Picture** window. Search through the files until you locate SLOGAN.JPG, select the file and click on **Insert** to insert the image into the slide. Click the left mouse button on the image and from the **Format** tab select click on the **Crop** tool icon.

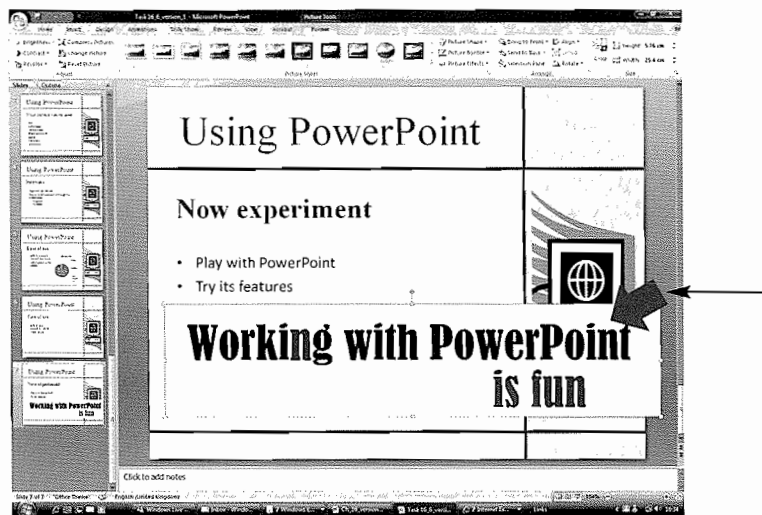
#### Hint

It is easier to manipulate these objects if the ruler is showing. To select the ruler, select the **View** tab, find the **Show/Hide** section and click on the tick box for **Ruler**.



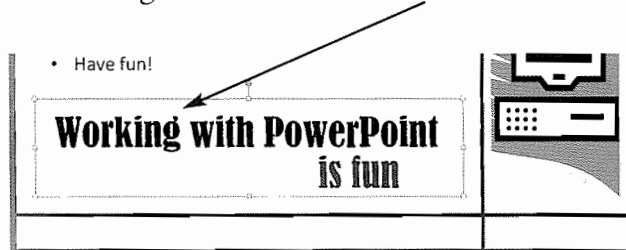
Drag the lower handle up the screen above the red line, but below the red text, to crop the image.

Click the left mouse button off the image then back on it and drag the image down so that the left and bottom edges are in the correct place on the slide.

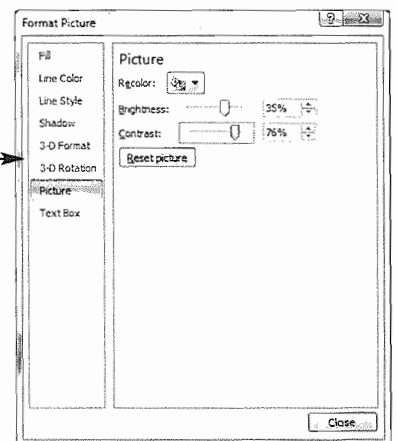


Grab the top right drag handle and drag this to resize the image to the correct position to the left of the vertical blue line.

The image should now look like this.

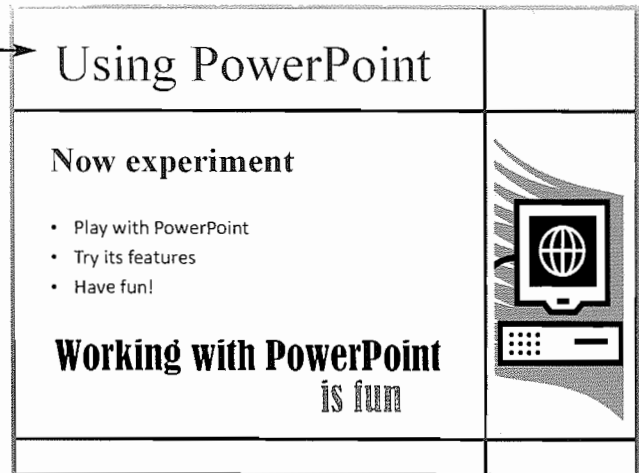


To remove the pale yellow background colour from this image, you need to adjust the image brightness and contrast. Click the right mouse button on the image and select **Format Picture...** from the drop-down menu. This opens the **Format Picture** window. Select the **Picture** option from the left side of the window. Move the sliders for the **Brightness** and **Contrast**, so that the pale yellow background disappears but the other colours remain unaffected. These figures are found using trial and error: both settings change from 0% to a brightness of around 35% and a contrast of around 75%. When you have completed this, click on **Close**.



The slide should now look like this.

Notice how the red colour in the text has changed from its original dark red colour (see the previous page) to this shade of red. Save the presentation.



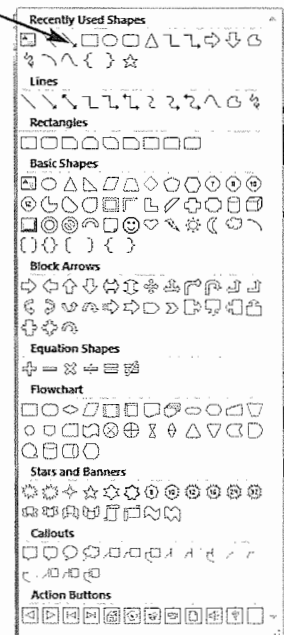
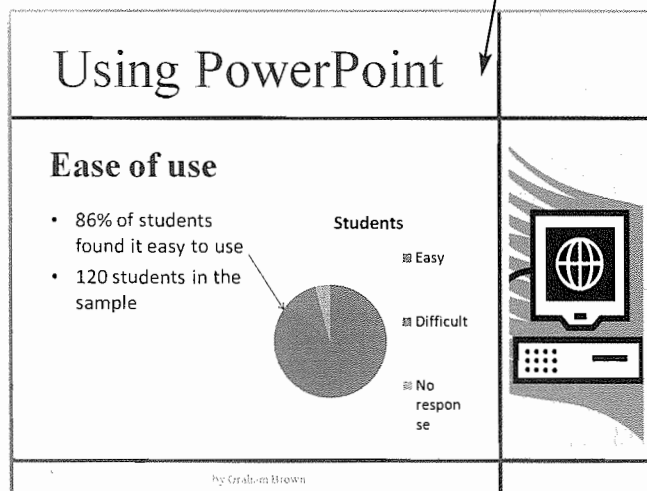
### Task 16g

Open the presentation that you saved in Task 16f. Add:

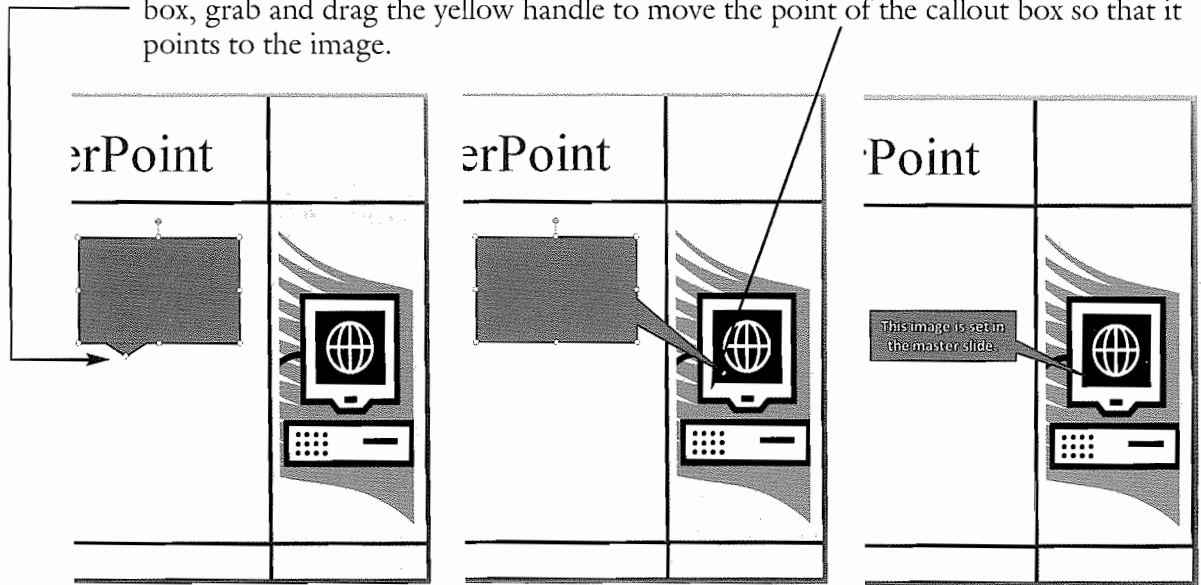
- an arrow to slide 5 pointing from the first bullet point to the largest segment of the pie chart
- a callout box to slide 6 telling the reader that the image of a computer is placed on the master slide
- the text '© Microsoft' to the end of the first bullet point on slide 7 in a black, 12 point sans serif font
- a 6 point horizontal red line to slide 7, above the image you inserted in Task 16f.

Open the presentation and select slide 5 using the **Slides** tab. Select the **Insert** tab and click on the **Shapes** icon. This drop-down menu of available shapes will appear. Select an arrow to be included on the slide. Click the left mouse button where you want the arrow to start and drag the point of the arrow to the position that you want it to finish.

The finished slide should look like this.

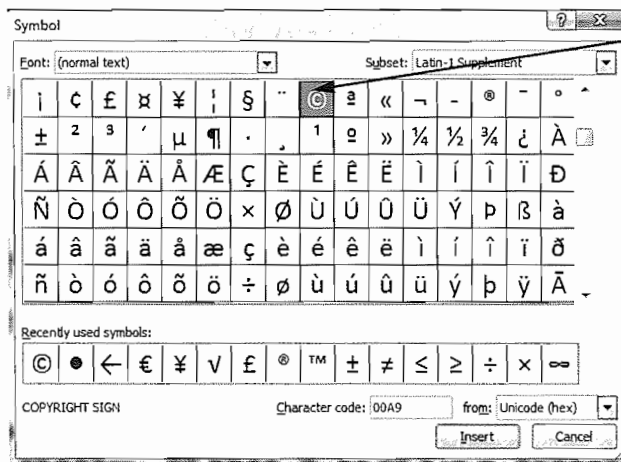


To place the callout box on slide 6, select slide 6 and again select the **Insert** tab and **Shapes** icon. This time select a callout box from the **Callouts** section of the drop-down menu. Click on the slide and drag the callout box to draw it. It is easier if you make the box too large and reduce the size later. When you have placed the box, grab and drag the yellow handle to move the point of the callout box so that it points to the image.

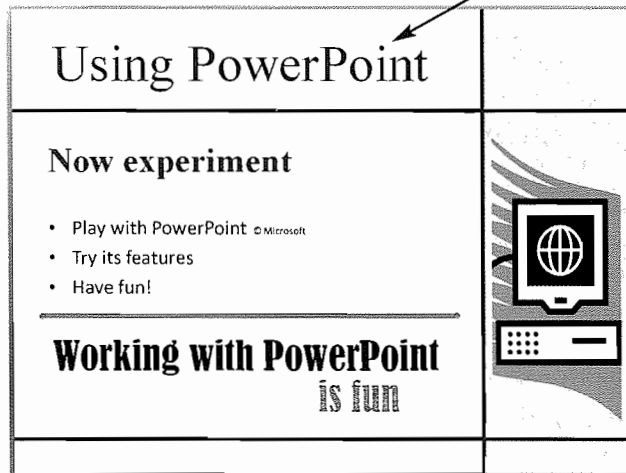


Type the text that you require into the callout box (you cannot see the cursor as you can with a text box) and then resize the callout box using the drag handles. It may look similar to this.

Select slide 7. To insert the copyright symbol, click the left mouse button to place the cursor after the 't' at the end of the first bullet point. Select the **Insert** tab and click on the **Symbol** icon. This opens the **Symbol** window. Scroll through the available list of symbols until you find the © symbol. Click on this symbol and then click on **Insert** followed by **Close**. Add the text 'Microsoft' after the symbol and highlight both the symbol and the new text. Set this to a black, 12 point sans serif font using the methods learned earlier in the chapter.



To insert the red line, select the **Insert** tab, then click on the **Shapes** icon and select a line. Drag the line horizontally across the page. Click the right mouse button on the line to open the **Format Shape** window. Use the **Line color** and **Line style** sections to change the colour and thickness of the line. The completed slide should look similar to this. Save the presentation.



## 16.7 Transitions between slides

### Task 16h

Open the presentation that you saved in Task 16g. Apply transitions between all slides in your presentation. In slide 3 animate all the bullets so that they appear one at a time.

The transitions between the slides are the methods used to introduce a new slide. This can be simply replacing the existing slide with a new slide or using a number of different features to change from one to another. All transitions are located in the tab.

Open the presentation. Select the **Animations** tab and find the **Transition to This Slide** section. Hold the mouse over each of the slide transitions to see the effect that it uses. There are more transitions available; you can use the scroll bar to see these.

### Hint

For the practical examinations, *always* use the same transition effect between slides and the same animation effect throughout the whole presentation. Consistency in these areas is just as important as using consistent styles and colour schemes.

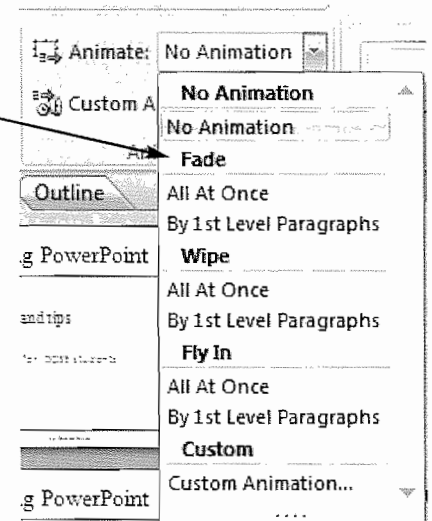


Click on the icon to select the transition that you wish to use and then click on the **Apply To All** icon to apply the same transition to all slides. This task is continued in the next section.

## 16.8 Animation effects

Select slide 3 and highlight *only* the bulleted list. Select the **Animations** tab and find the **Animations** section on the left. Select the drop-down list next to the **Animate:** icon, which will look like this. The task instructed you to ‘animate all the bullets so that they appear one at a time’, so select **Fade**, **Wipe** or **Fly In** with **By 1st Level Paragraphs**. This sets the animation.

It is a good idea to have the **Custom Animation** pane open, so that when you need to show evidence of your animation effects these can be seen. To do this, still in the **Animations** tab, click on the **Custom Animation** icon. The button at the bottom of the **Custom Animation** pane allows you to test your animation and see if it works as you intended. Each individual animation can be edited in the **Custom Animation** pane by clicking on the item in the pane and clicking the right mouse button to obtain the options. The order of animation can also be changed by dragging the items up or down in the **Custom Animation** pane list. Save the presentation.



## 16.9 Saving and printing a presentation

As with all your work, make sure that you save your presentations regularly using the **Office** button and **Save**. To print evidence of your work, you must identify what types of printouts are required. Sometimes you will be expected to print only the slides, but more often you will need to print audience or presenter notes; for these printouts you will need to select the **Office** button and **Print**. To print evidence of the transitions and animations, screenshot evidence is the best method.

### Task 16i

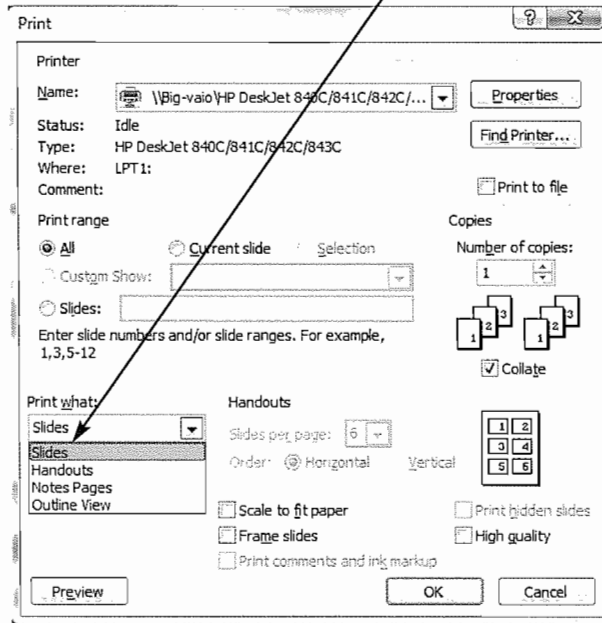
Open the presentation that you saved in Task 16h. Print your presentation showing:

- only the slides
- presenter notes
- audience notes with three slides per page and space for the audience to make notes
- evidence of the transitions between slides
- evidence of the animations used on slide 3.



## Printing slides

Select the **Office** button and **Print**, to open the Print window. In the **Print what:** drop-down list, select **Slides**. This will print only the slide/s content with no additional notes or space.



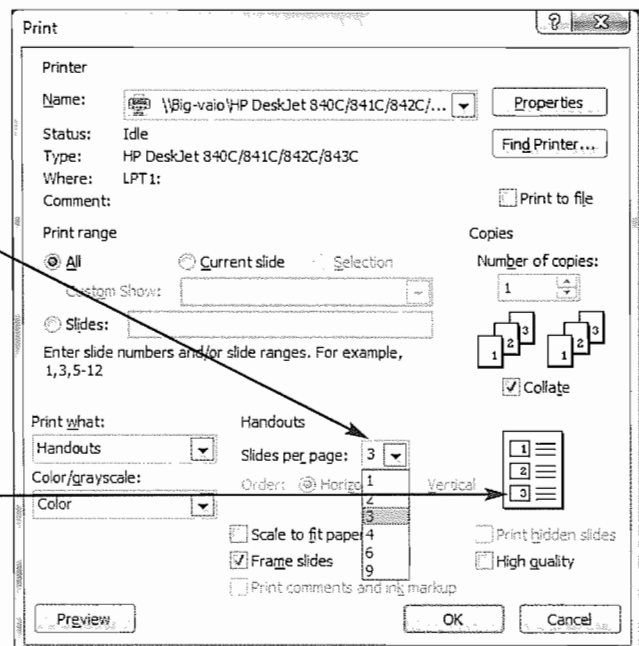
## Printing presenter notes

In the **Print what:** section, select **Notes Pages**. This will print the content of the slides and the presenter notes that you typed in the Notes section for each slide.

## Printing audience notes

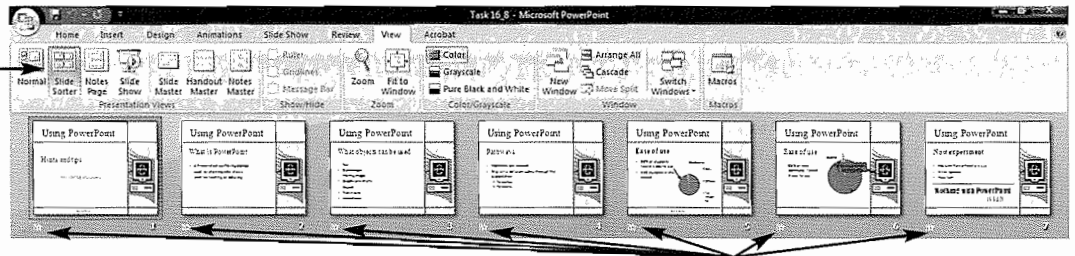
In the **Print what:** section, select **Handouts**. This will give you several options to select from. The task asks for three slides per page, so in the **Slides per page** section, select the number 3 from the drop-down list. The small image to the right shows you what the printed pages will look like. In this case, the three slides are to the left and space to make notes on the right. This matches the requirements of the task.

You can click on **Preview** to check the printout is as you intended before printing or click on **OK** to print.



## Printing evidence of slide transitions

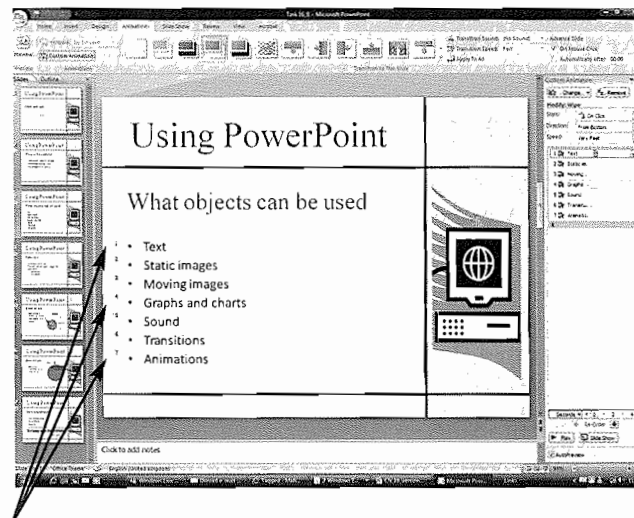
Select the **View** tab and click on the icon for **Slide Sorter** view. Use the <Print Screen> key on your keyboard to copy this into the clipboard and paste the image into a word-processed document so that you can add your name and other details before sending it to the printer.



You can see from the **Slide Sorter** view the evidence that transitions have been added to each slide.

## Printing evidence of animations

Select the **View** tab and click on the **Normal** icon to return to the **Normal** view of the slides. Select slide 3. Make sure that the **Custom Animation** pane is visible to the right of the slide. If it is not visible, open it using the **Animations** tab followed by the **Custom Animation** icon. Use the <Print Screen> key on your keyboard to copy this into the clipboard and paste the image into a word-processed document so that you can add your name and other details before sending it to the printer.



The numbering next to each bullet point shows that each bullet is animated separately from the others. Further detail about the animation of bullet point 1 can be seen in the **Custom Animation** pane. If the individual bullets are not visible, click on the icon in the **Custom Animation** pane to pull down the list.

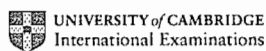
**Activity 16b**

Open the presentation that you saved in Activity 16a.

Add the following presenter notes to the slides:

- Slide 1: Welcome to my presentation giving tips about website authoring using html.
- Slide 4: An intranet is internal within an organisation and is managed. The internet is global and is not managed.
- Slide 6: There are many other websites that can offer you help.

Place the image WEBSITE.JPG on the right side of slide 6. Crop this image so that only the crest and name are visible like this.



Add a red arrow, 3 points wide, from the text 'CIE website' to point to this image.

Apply transitions between all the slides in your presentation.

In slide 3 animate all the bullets so that they appear one at a time, in the order that they are in the list.

Print the presentation showing:

- presenter notes
- audience notes with six slides per page
- evidence of the transitions between slides
- evidence of the animations used on slide 3.

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